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# POLAR MOTION DETERMINATIONS BY U. S. NAVY DOPPLER SATELLITE OBSERVATIONS

R. J. Anderle

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U. S. NAVAL WEAPONS LABORATORY  
DAHLGREN, VIRGINIA



**U. S. NAVAL WEAPONS LABORATORY**

**Dahlgren, Virginia**

**22448**

Steven N. Anastasion, Capt., USN  
Commander

Bernard Smith  
Technical Director

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FOREWORD

The axis of rotation of the earth is not fixed in the earth; the imaginary point where the axis intersects the earth's crust describes a roughly circular motion, five to ten meters in radius, with a period of 400 days. This "Chandler Wobble" has been precisely measured by astronomical techniques for many years. In 1969, U.S. Navy scientists found that the motion could be determined with the use of Doppler observations of an artificial earth satellite. This report reviews the results obtained during the past year. It was prepared in response to an invitation by Professor P. Melchior to discuss the results during meetings of the Commission on the Rotation of the Earth at the Brighton General Assembly of the International Astronomical Union in August 1970.

The satellite orbits upon which these results are based were computed under the direction of Steve J. Smith using computer programs prepared largely by Treva B. Daniels. Larry Beuglass collaborated with the author in determining the position of the pole from these data with the able assistance of V. Louise Brooks. We are particularly grateful to Charles J. Cohen for his technical guidance in all aspects of the satellite geodesy program.

RELEASED BY:

*Ralph A. Niemann*

22 July 1970

RALPH A. NIEMANN, Head  
Warfare Analysis Department

ABSTRACT

The irregular motion of the earth's axis of rotation, known as Chandler Wobble, has been determined on the basis of Doppler observations of Navy Navigation Satellites. Measurement precisions of about 0.5 meters have been obtained for averaging times of six days. Agreement with astronomical determinations is better than one meter over the last two years. The discrepancies are no larger than differences between results for different groups of observatories as reported by the Bureau International de L'Heure and by the International Polar Motion Service.

## INTRODUCTION

Doppler satellite observations have been used in the development and operation of the Navy Navigation Satellite System (Kershner, 1967) since the launch of the Transit 1B satellite in 1960. The usefulness of such observations for geodetic applications, indicated in 1963 (Anderle and Oesterwinter), was exploited in succeeding years (Anderle 1967). During the course of these geodetic operations, it was found that the relation between the earth's geographic pole and the earth's instantaneous spin axis could be obtained as a by-product of this work (Anderle and Beuglass, 1970 a,b). The use of Doppler observations for such determinations of the position of the pole is described below. It should be emphasized that the determination is made from intermediate output of the geodetic operations at minimum cost; improved computational procedures applied to the original observational data would produce somewhat more accurate values for the position of the pole. A considerable improvement in results is evident over the course of the last three years as a result of computational changes designed to improve geodetic operations. Changes in computational procedures specifically designed to improve polar motion results are also being made.

## OBSERVING EQUIPMENT

Thirteen semi-permanent satellite observing stations have been used to obtain Doppler data for geodetic applications; but at any given time, observations may also be received from a dozen mobile or cooperating stations. For the sake of consistency, the polar motion results reported to date primarily reflect the observations made at the 13 geodetic stations. While details of the design of the Doppler equipment varies from station to station, the measurements obtained are essentially the same. The Howard County, Maryland, station is one of the most elaborate sites. It includes two complete stations which permits controlled tests of modifications to the equipment. The Applied Physics Laboratory of Johns Hopkins University, which has responsibility for the technical operation of the observing net, operates a control center also located at Howard County, Maryland. The control center receives the observations from all sites daily by teletype and advises the stations of the quality of the observations. The operation and logistic support for the field stations is the responsibility of the Doppler Satellite Office at the Pacific Missile Range (PMR), California. The majority of the sites are actually operated by the faculty and students of the New Mexico State University under contract to PMR. Figure (1) shows one of the mobile vans used in operations such as determining the position of LORAN navigation beacons. The van is the most compact equipment used to date in such geodetic operations. New equipment, designated GEOCEIVERS, are now in production. The equipment, shown in figure (2), weighs under 100 pounds, exclusive of the power source. This equipment will produce data which are different in form, but equivalent in accuracy, to those from the current system. But, since the equipment has not been used in polar motion calculations to date, its data format will not be discussed here.

DOPPLER MOBILE VANS

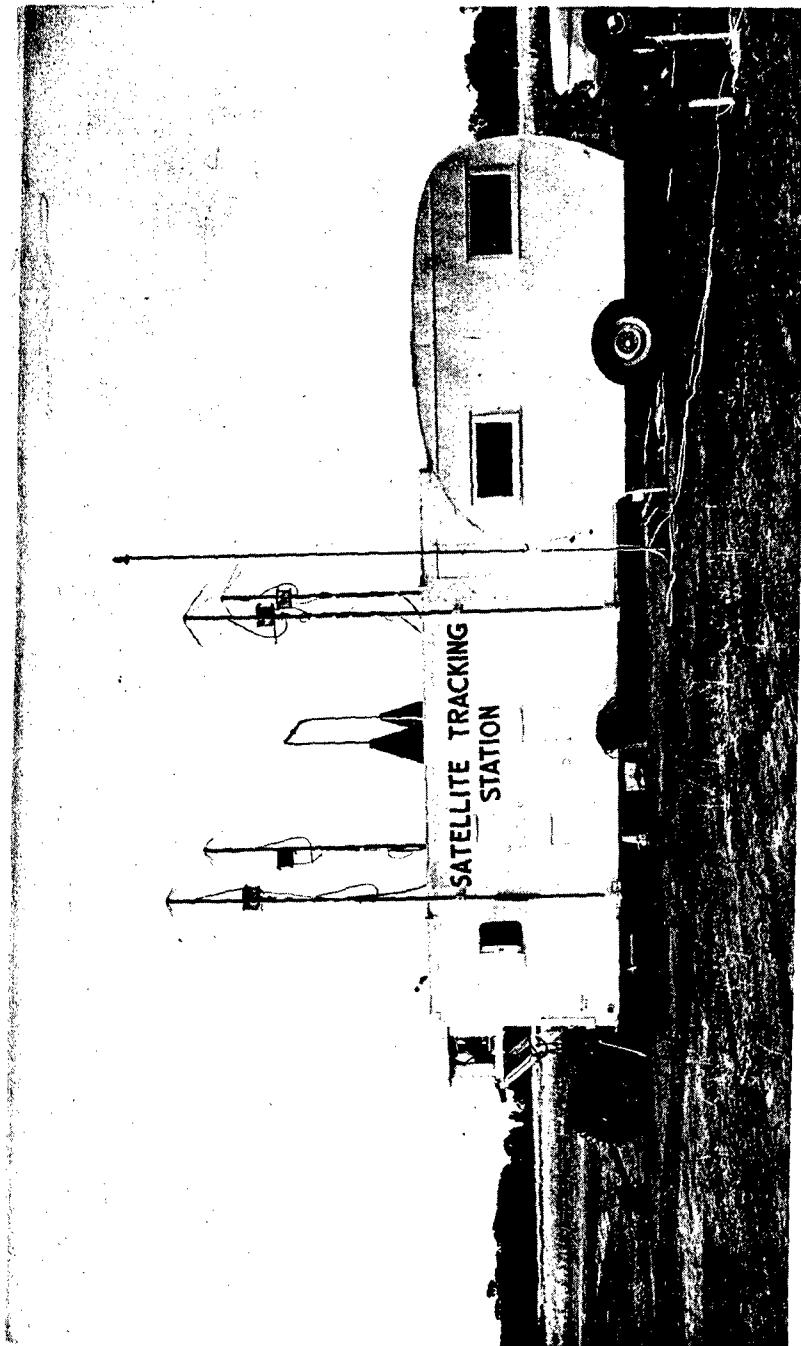
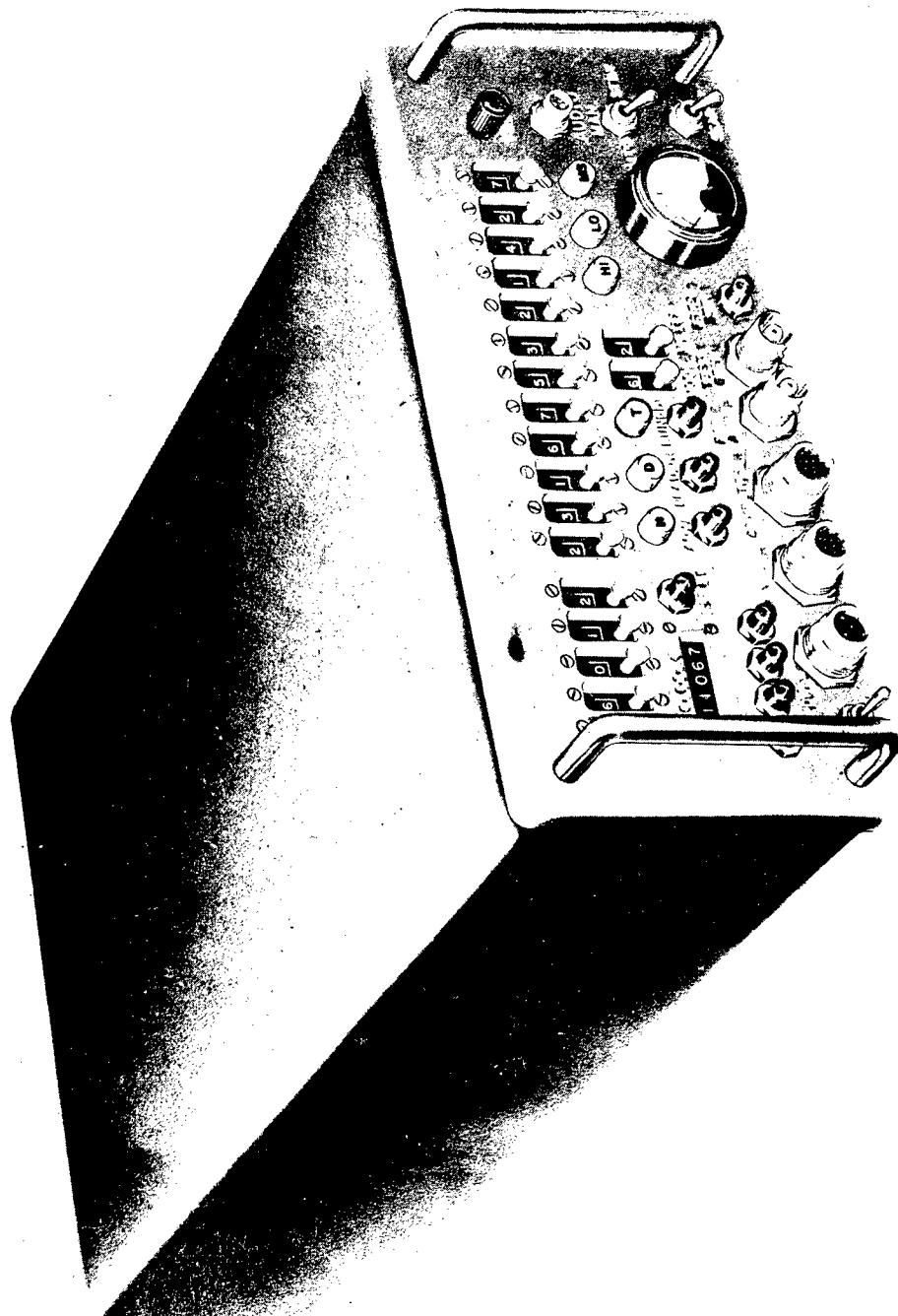


Figure (1)

MOCK-UP OF GEOCEIVER

Figure (2)



Each station is capable of receiving on at least four frequencies which are approximately 150, 162, 324 and 400 Mhz. Polar motion results have been based on observations of the Navy navigation satellites which transmit at about 150 and 400 Mhz. The receiving stations combine these signals by analog means to obtain a signal which is free of first order ionospheric refraction effects (Newton 1967). The combined signal is then mixed with a reference signal and the time required to count a preset number of beats between the frequencies is measured. The measurements, started each four seconds of time and lasting almost a second, are automatically punched on teletype tape. The time at which satellite time pulses are received are interspersed among these measurements at two minute intervals for use in synchronizing the ground station clocks. The 300 or so observations are preceded by a manually punched header message which includes calibration constants and identifies the station, satellite, date, and hour. The entire message is transmitted by teletype to the control center shortly after the pass is completed. The control center transfers the data from paper tape to magnetic tape for use in the computers.

#### GEODETIC COMPUTATIONS

The satellite observations are transmitted from the control center in Maryland to the computational facility at the Naval Weapons Laboratory, Dahlgren, Virginia, every 24 hours over a telephone line in a magnetic tape-to-magnetic tape transmission. It is convenient for the geodetic computations to compute the orbit of any selected satellite every second day based on 48 hours of observations. This interval is long enough to permit a determination of the position of mobile observing stations but short enough to maintain a regular check of the performance of the equipment. The raw observations are converted to frequency measurements, and various calibration, filtering and aggregating operations are performed (Anderle, 1965). The time pulses received from the satellite by the Howard County observing station are used to calibrate the epoch and rate of the satellite clock against UTC; the calibrated clock transmissions are then used to synchronize the clocks at the other observing stations. The filtering process eliminates observations which are bad due to loss of lock of the satellite signal or transmission errors; the filtering also detects entire passes which show systematic errors. Finally, groups of eight filtered observations are aggregated in an averaging process to obtain about 40 observations of frequency with associated standard errors for each satellite pass for use in the orbit refinement. In the least squares orbit determination, the earth's gravity field and the coordinates of the fifteen base stations are fixed at values obtained in a general geodetic solution. Changes in these parameters were made in recent years on:

Gravity Field

20 Feb 1967

18 Apr 1968

13 Feb 1970\*

Station Coordinates

20 Feb 1967

19 Jan 1968

Unknowns in the solution are the six orbit constants, a drag scaling factor, the coordinates of each mobile observing station, and a frequency and frequency drift bias for each pass. The orbit computation is done by a 10th order Cowell integration and includes effects of lunar-solar gravitational attraction, effect of land tides on the potential (but not on station position), effect of nominal solar radiation pressure, effect of tropospheric refraction for a nominal atmosphere, and the effect of earth's precession and nutation. Extrapolated values for the polar motion and variation in earth's rotation are used. The accuracy of this computed orbit is estimated to be about 10 meters (Anderle, Malyevac and Green 1969) in an earth-fixed coordinate frame. A significant bias in right ascension of the satellite is present because the conversion from UTC to UT-1 time is done using poorly extrapolated values for the difference; however, the longitude of the satellite relative to longitude of the stations is not subject to errors in the difference. Upon completion of the least squares solution for orbit constants and the other parameters described above, the final satellite orbit is used to obtain a measure of the quality of the solution. For this purpose, the orbit and the data obtained on each satellite pass is used to make a least squares solution for frequency bias and for two components of station position: one component is parallel to the satellite velocity vector at closest approach of the satellite to the station while the other component is parallel to the sight line from the station to the satellite at the same time. The standard deviation in these quantities obtained during a month is plotted in figure (3) versus elevation angle to the satellite at closest approach. The graph shows that the errors for passes at high elevation angles are two meters and seven meters in the slant range and tangential directions, respectively, while the errors at low elevation angles are about twice as large due to the greater distance from the station to the satellite and higher residual refraction errors. These errors are a composite of the errors in satellite position, errors in station position, and instrumentation errors. In 1969, it was found that errors in the assumed position of the pole can be found by analysis of these tangential errors.

---

\*For satellite 1967-34A and 1968-12A; 3 Feb and 6 Feb for satellite 1967-92A and 1967-48A, respectively.

RESIDUALS FOR POLAR ORBIT

26 MAY - 24 JUNE 1970

SATELLITE 1967-92A

△ TANGENTIAL RESIDUAL

○ SLANT RANGE RESIDUAL

15

10

5

0

RMS OF RESIDUALS (METERS)

ELEVATION ANGLE (DEGREES)

80

40

60

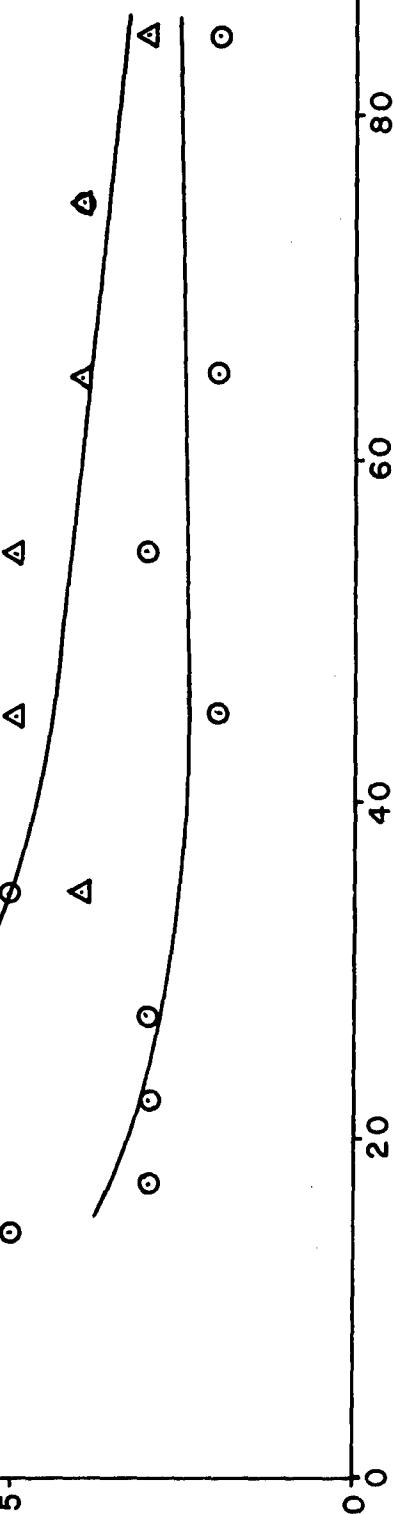


Figure (3)

## POLE POSITION COMPUTATIONS

The tangential component of the error in the computed satellite orbit determined from each pass of the satellite over each observing station during a two day span is shown in figure (4). The figure shows a sinusoidal error of about 5 meters amplitude with a 24 hour period which was due to the use of an incorrect pole position in the computations. The way this effect arises for a satellite in a polar orbit is shown by the diagrams in figure (5): Assume the true pole is on the spin axis, and assuming that the true pole and the assumed pole lie in the plane of the orbit at some instant of time, as shown in the left side of the figure. Then there will be a tangential error in the computed satellite position (or navigated station position) for any station lying in the orbit plane; six hours later, the assumed pole will have rotated 90 degrees, as shown on the right hand side of the figure, so that there will be zero error in the tangential direction. Thus an error with a 24 hour period is introduced which cannot be absorbed in the solution for orbit constants. The pole position computation consists of the solution for the phase and amplitude of this error and conversion of these quantities to pole position displacement (figure (6)). Such a solution ignores the information on pole position which is contained in the errors in the slant range direction. The slant range errors yield weaker information on pole position because of low sensitivity of slant range to pole position error for stations at low latitudes or for satellite passes at high elevation angle. Until the middle of 1970, the solution for the phase and amplitude of the tangential error also included a constant and a linear term in the least squares solution. The four parameters were used on the theory that imperfect distribution of observations, together with an error in the pole position, may have yielded erroneous values for the mean anomaly and mean motion of the satellite in the fit of orbit constants. Under this assumption, it was necessary to solve for the four parameters using the observations made in the same 48 hour span considered in the orbit fit. It was subsequently found that solutions for the two periodic coefficients based on each 24 hours of observations gave results equivalent to the four parameter solutions based on 48 hours of data. Since more frequent solutions are desirable, future solutions for pole position will probably be based on 24 hours of observations regardless of the time span of data used in the original orbit fit. As shown in figure (3), the accuracy of determination of the tangential errors varies with elevation angle to the satellite at closest approach. The accuracy also varies with the size of the random error of the original frequency observations. Therefore each observation used in the two or four parameter solution is weighted inversely according to the empirical formula  $(.004^2 + \sigma^2) (6 + 2 \times 10^{-6} (80 - \varphi)^3)^2$  where  $\sigma$  is the random error in the frequency observations in Hz per 108 Mhz and  $\varphi$  is the elevation angle in degrees. The standard error of each solution for pole position is computed from the residuals of fit and covariance of the solution for the nominal weighting of the observations. The standard error of the corrected pole position is about a meter on the average. Means and standard deviations of solutions made in five or six day intervals are also obtained in order to express the results in more compact form.

ALONG TRACK RESIDUALS  
17 And 18 January 1969  
Satellite 1967-48A

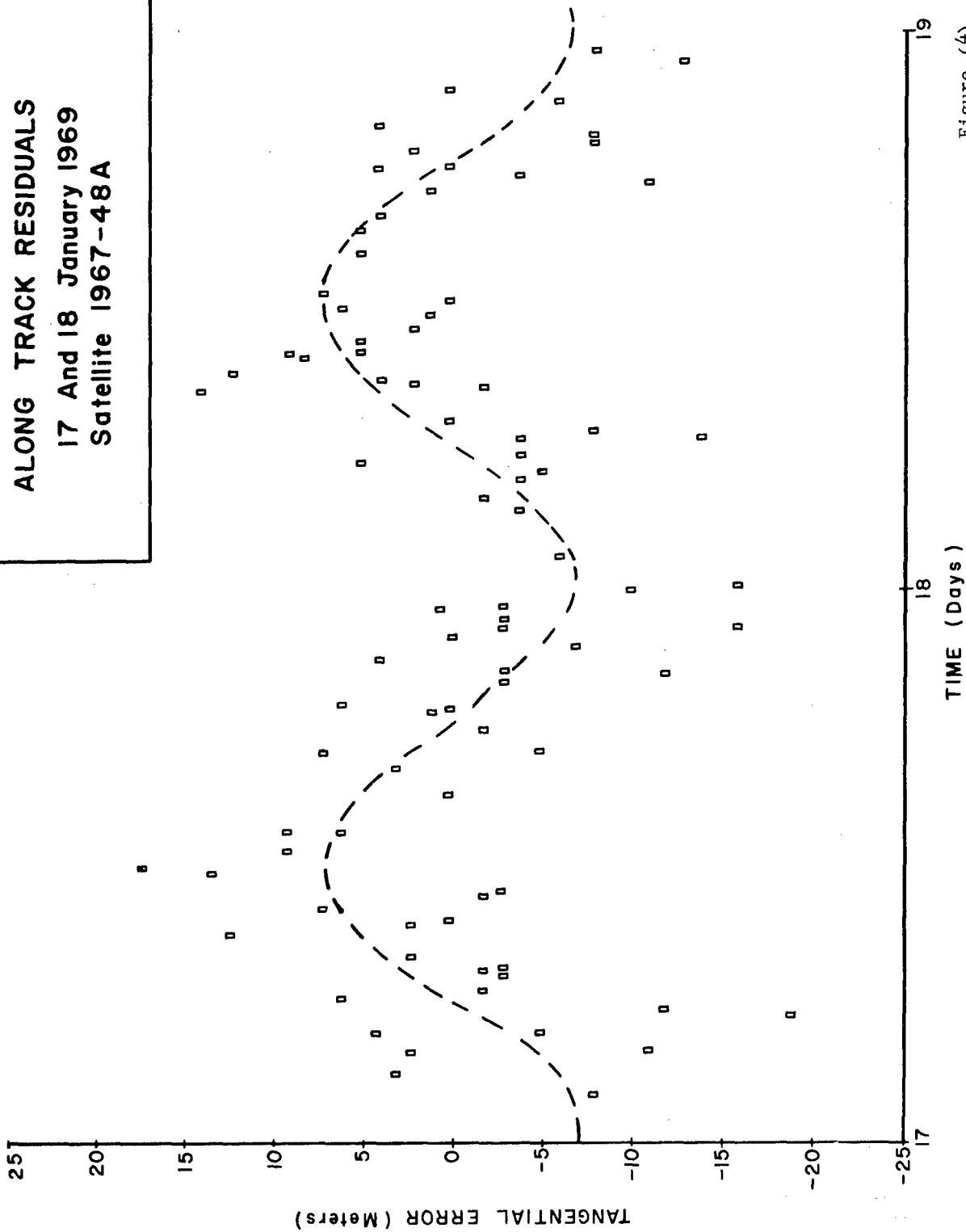
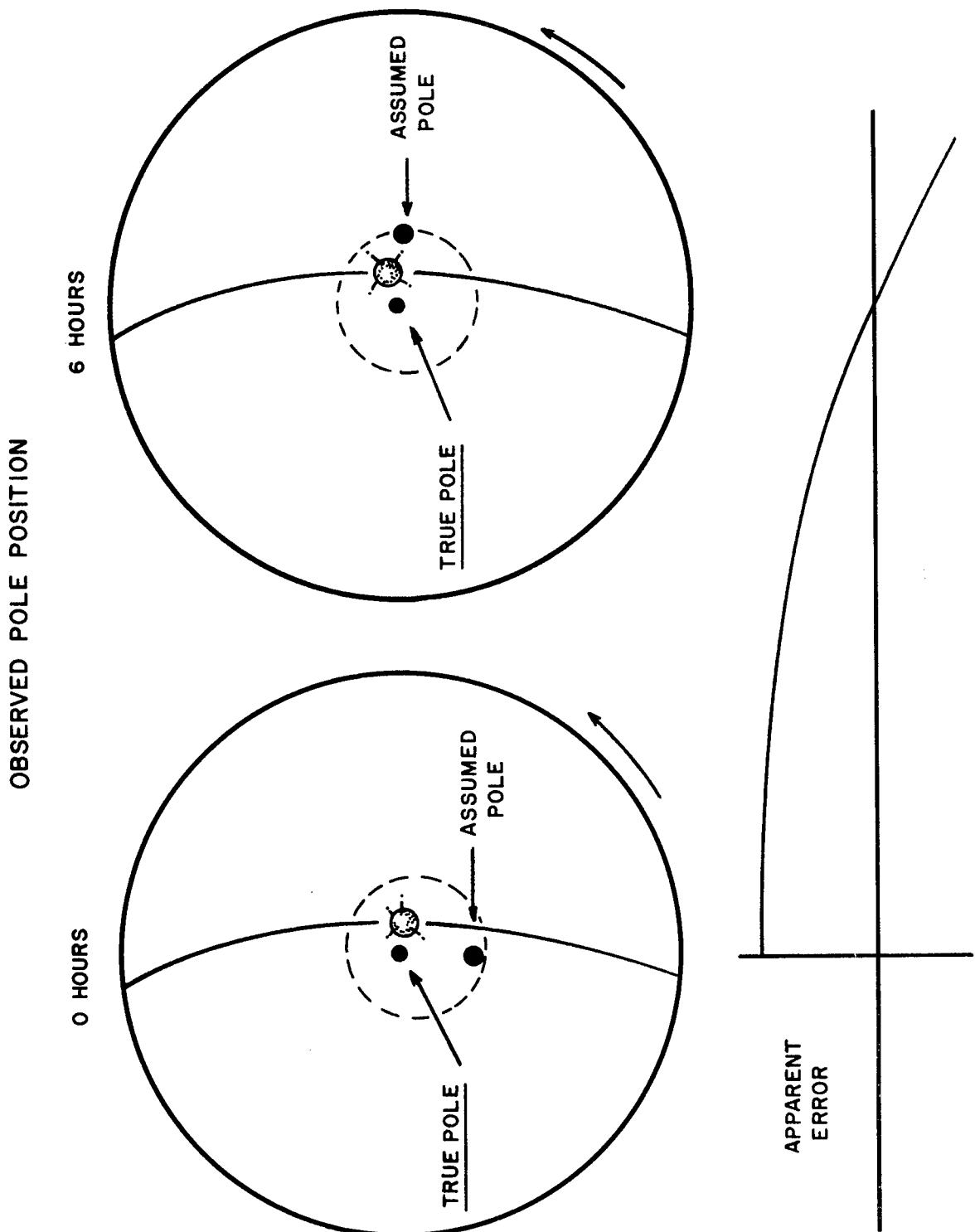


Figure (4)

Figure (5)



## POLE POSITION COMPUTATION

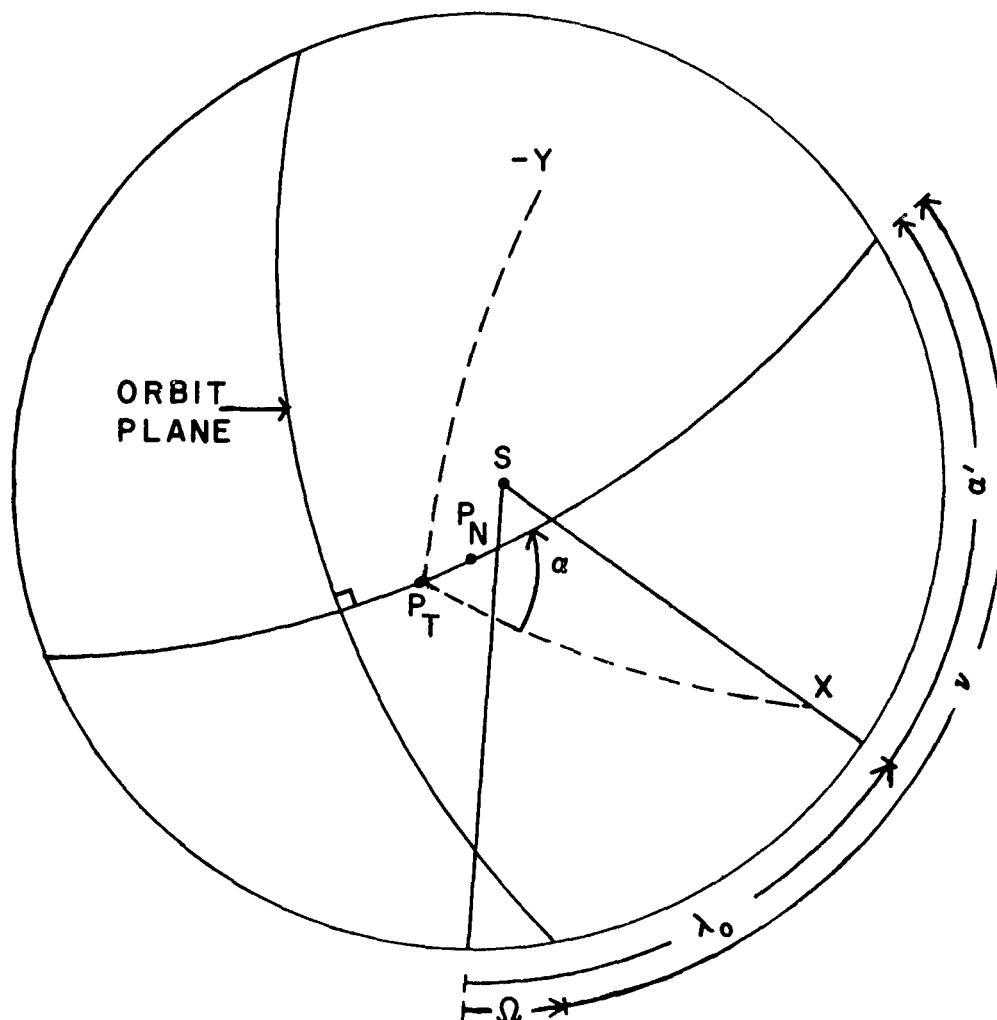
$$\text{ERROR} = A \cos \lambda + B \sin \lambda$$

$\lambda$  = HOUR ANGLE OF GREENWICH

$P_N$  = NOMINAL POLE POSITION

$P_T$  = TRUE POLE POSITION

$\overline{P_N P_T}$  IS NORMAL TO ORBIT PLANE WHEN  $\lambda_0 = \tan^{-1} \frac{A}{B}$



S = SPIN AXIS

$\Omega$  ~ RIGHT ASCENSION OF NODE

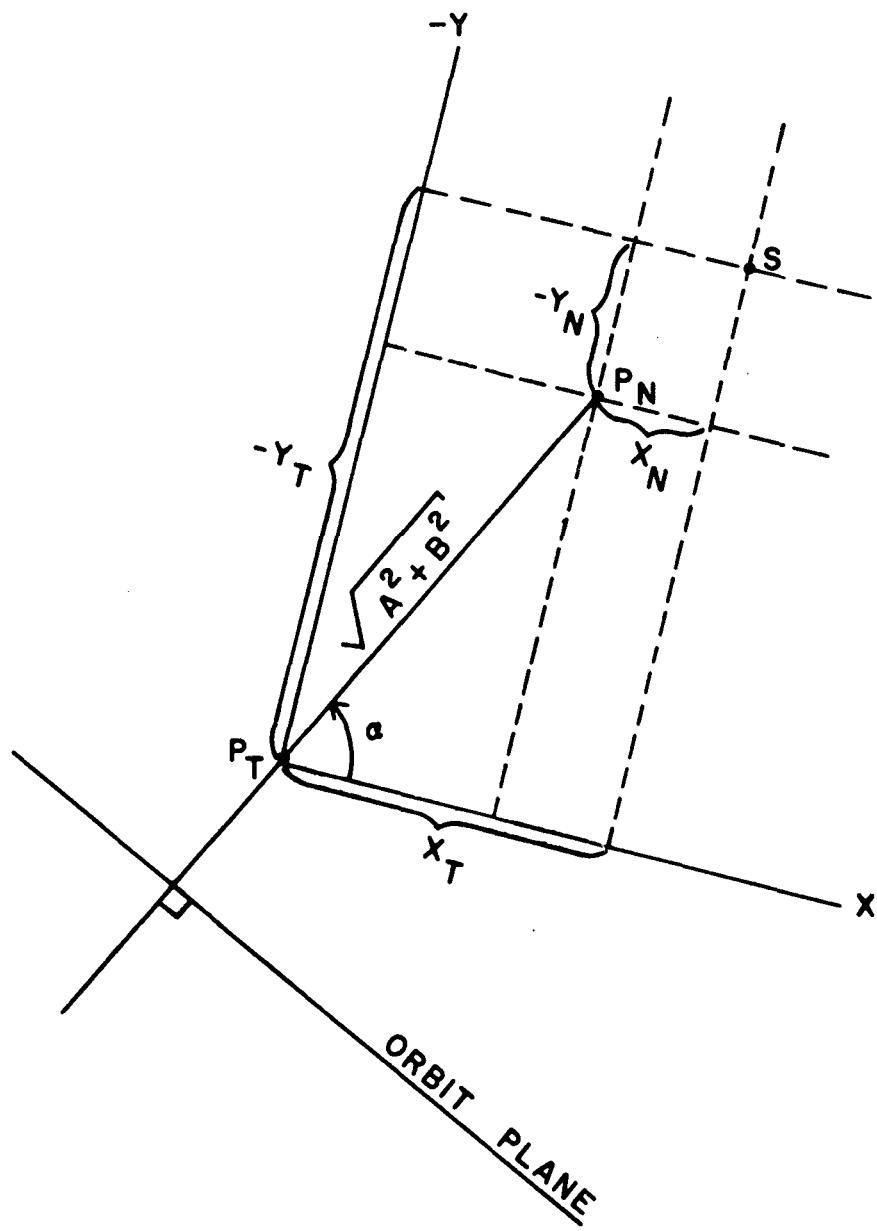
$\alpha' \sim \alpha$

$\nu \sim 90^\circ$

$$\text{so } \alpha \sim \Omega - \lambda_0 + 90^\circ$$

Figure (6a)

## DETAIL OF POLE POSITION COMPUTATION



$$X_T = X_N + \sqrt{A^2 + B^2} \cos \alpha$$

$$Y_T = Y_N - \sqrt{A^2 + B^2} \sin \alpha$$

Figure (6b)

## ERROR SOURCES

Consideration has been given to the following sources of error in the pole positions computed from Doppler observations of artificial earth satellites:

1. Origin of the coordinate system.
2. Errors in UTC-UT1.
3. Changes in station distribution.
4. Other computational errors.

An attempt was made to refer the coordinates of the Doppler observing stations to the CIO pole through BIH values for the instantaneous pole position at various points during the period 1961-1967 (Anderle and Beuglass 1970a). However, recent Doppler solutions for the position of the pole based on these coordinates show a bias with respect to IPMS and BIH results, particularly in the Y direction. Therefore the following arbitrary corrections must be added to the coordinates reported by the Dahlgren Polar Motion Service to achieve consistency with astronomic results:

$$X_{IPMS} - X_{DAHLGREN} = 0.0 \text{ M}$$

$$Y_{IPMS} - Y_{DAHLGREN} = 2.0 \text{ M}$$

The values for UTC-UT1 used in the Doppler calculations have at best contained significant errors of extrapolation and at worst ignored the (UT2-UT1) correction. In principle, this error should simply yield a different orbit plane in inertial space, leaving earth fixed computations, (including pole position computations) unaffected. Numerical experiments with gross errors in UTC-UT1 have substantiated this theory. While the reference orbits include data from varying numbers of observing stations, pole position calculations have been based on residuals from these orbits for a group of thirteen stations. Only one station in this network has been changed in recent years (Hawaii was moved to Wake). Experiments conducted omitting data from subsets of the station net have shown that (1) significant changes could be made to the station net without biasing the results but that (2) deleting a selected set of four stations from the net would seriously bias the results (Anderle and Beuglass 1970b). Therefore, effects of any future changes in the net will have to be tested. Experiments showed that the adoption of a new gravity field for the computations in February 1970 produced a bias in the pole position of about a meter. The bias may result from readjustment of the first order gravity terms which also produces a diurnal effect on the residuals. All reported results have been corrected for this bias, but the value of the bias is uncertain to few tenths of meters as shown by the results for the following test cases:

New\* Minus Old

	<u>X</u>	<u>Y</u>
Day 46 1969	-0.1 M	0.5 M
Day 154 1969	-0.6	-0.2
Day 258 1969	-0.3	-0.1
Day 328 1969	0.2	-0.5
Day 50 1970	1.0	0.2
	—	—
Mean	0.0	0.0
Std Dev	.5	.3
Std Error	.3	.1

Effects on pole position of earlier changes in the gravity field have not been evaluated. However, the earlier results are subject to larger random errors and possible biases due to a variety of deficiencies in the orbit computation program which were corrected in mid-1968.

POLE POSITION RESULTS

The pole positions computed from the results of each orbit computation available from January 1967 through mid 1970 are tabulated in Appendix A. Means and standard errors of results obtained within six day spans are also shown on the tables. The values for the Y coordinates were found to be about two meters lower than the astronomic results. Since the origin of the coordinate system is relatively arbitrary, this bias was corrected before the results were plotted in figures (7) and (8). Starting in mid 1968, the agreement between the Doppler and Astronomic results is about as good as the agreement between the BIH and IPMS results. The agreement for 1969 is especially striking. The Doppler biases in 1967 and early 1968 are probably due to poorer computational techniques used in computing the satellites orbits. The Doppler results for the X coordinate in 1969 are in much better agreement with the IPMS data than the BIH data. However in other places, such as for the Y coordinate in 1967, the Doppler results seem to reflect the trends in the BIH data better than those in the IPMS data. The path of the pole for 1969 determined on the basis of the Doppler observations is shown in figure (9) along with that obtained by the BIH and the IPMS. The ellipses show the standard error of the Doppler observations. The diameter of the Doppler curve in the X - direction is larger than that of the IPMS which in turn is larger than that of the BIH.

---

\*After bias correction

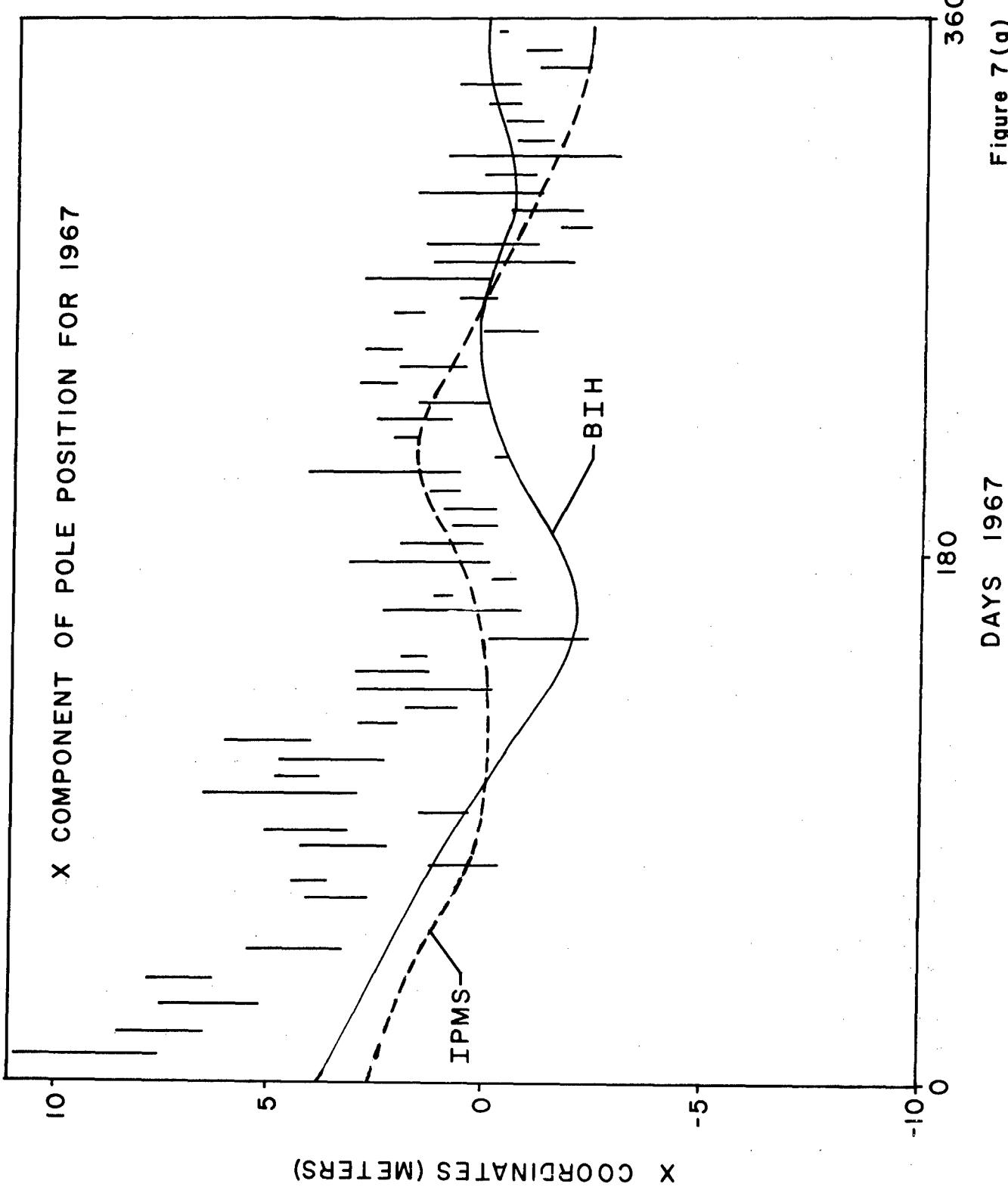
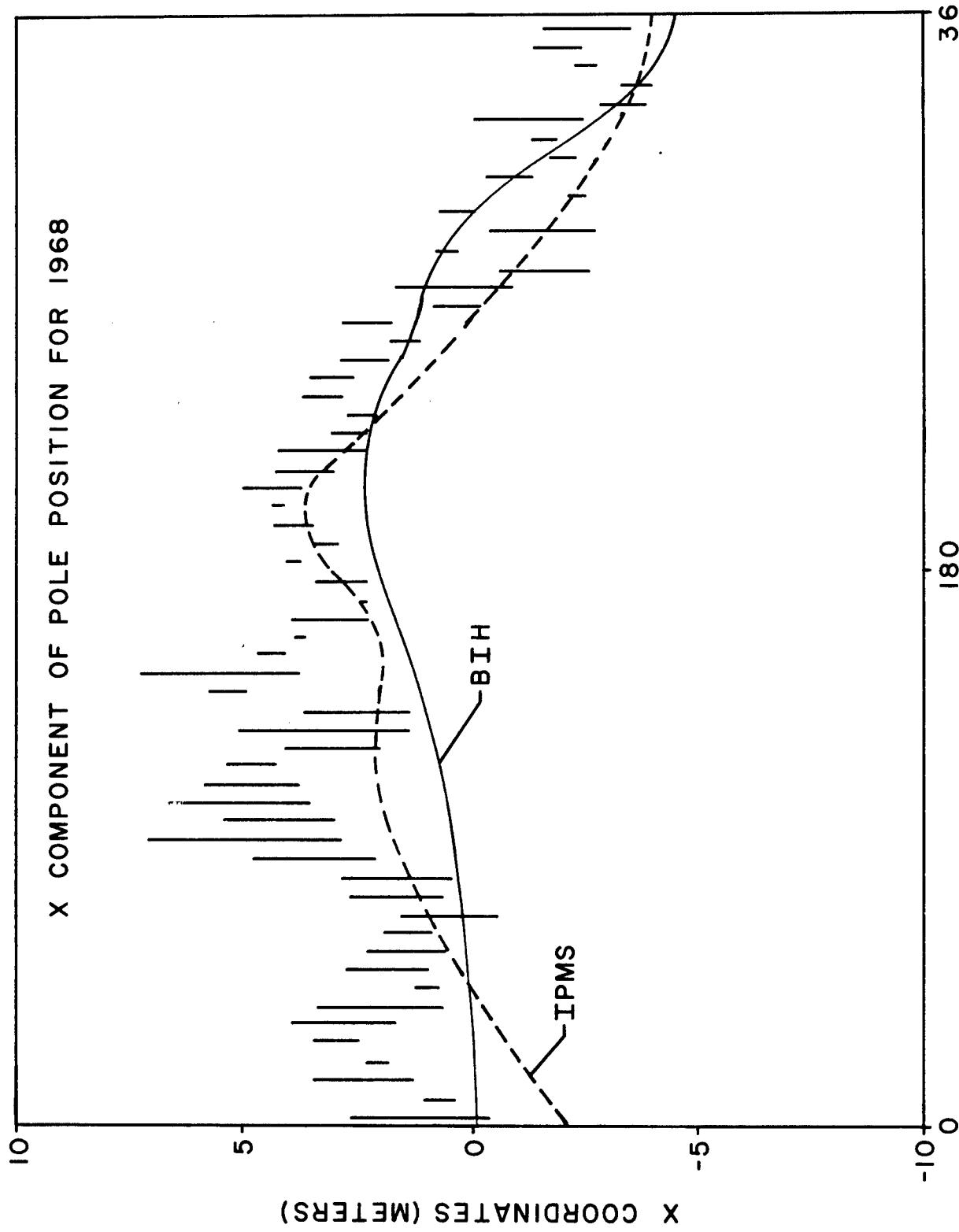


Figure 7 (a)

Figure 7 (b)



X COMPONENT OF POLE POSITION FOR 1969

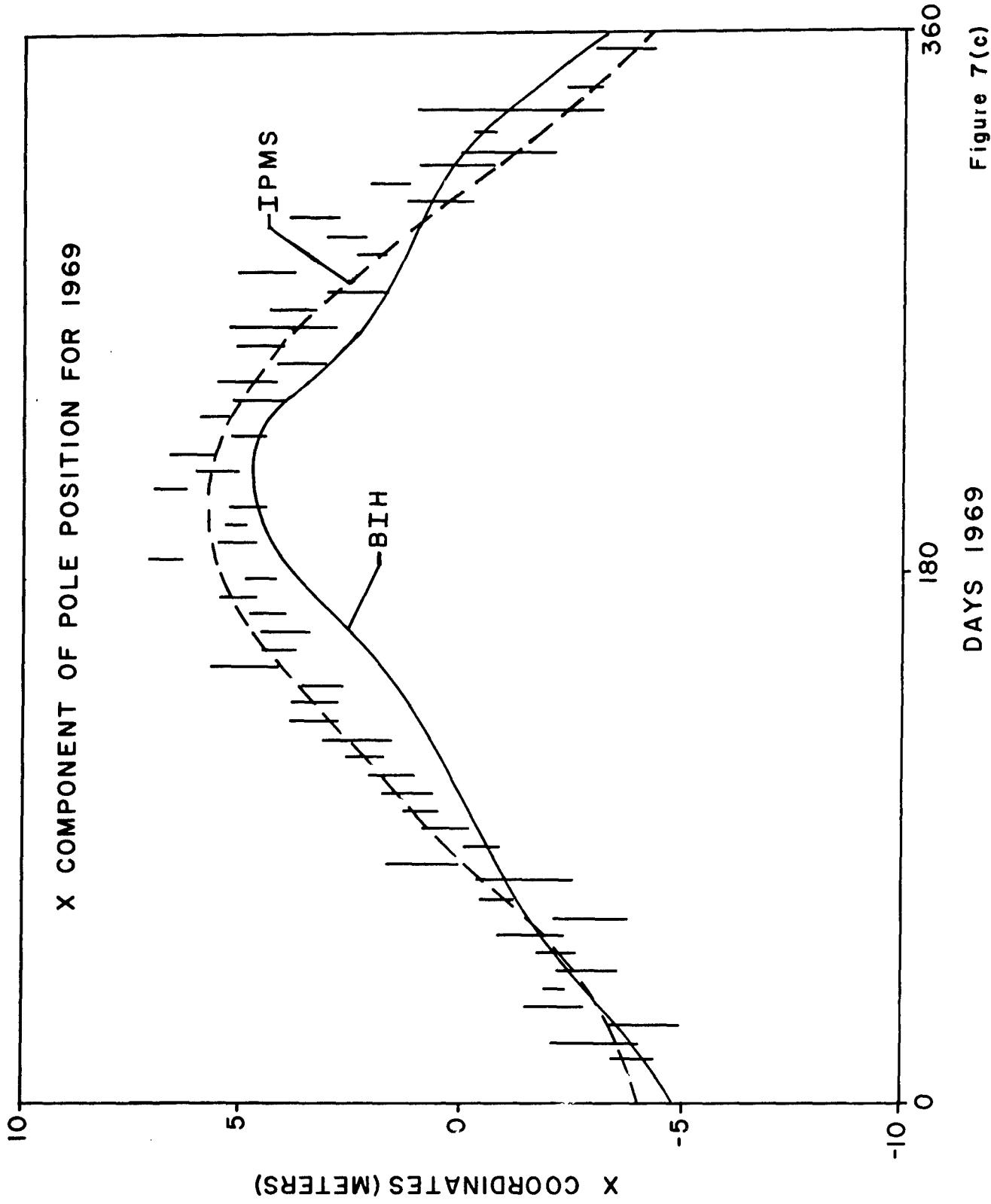
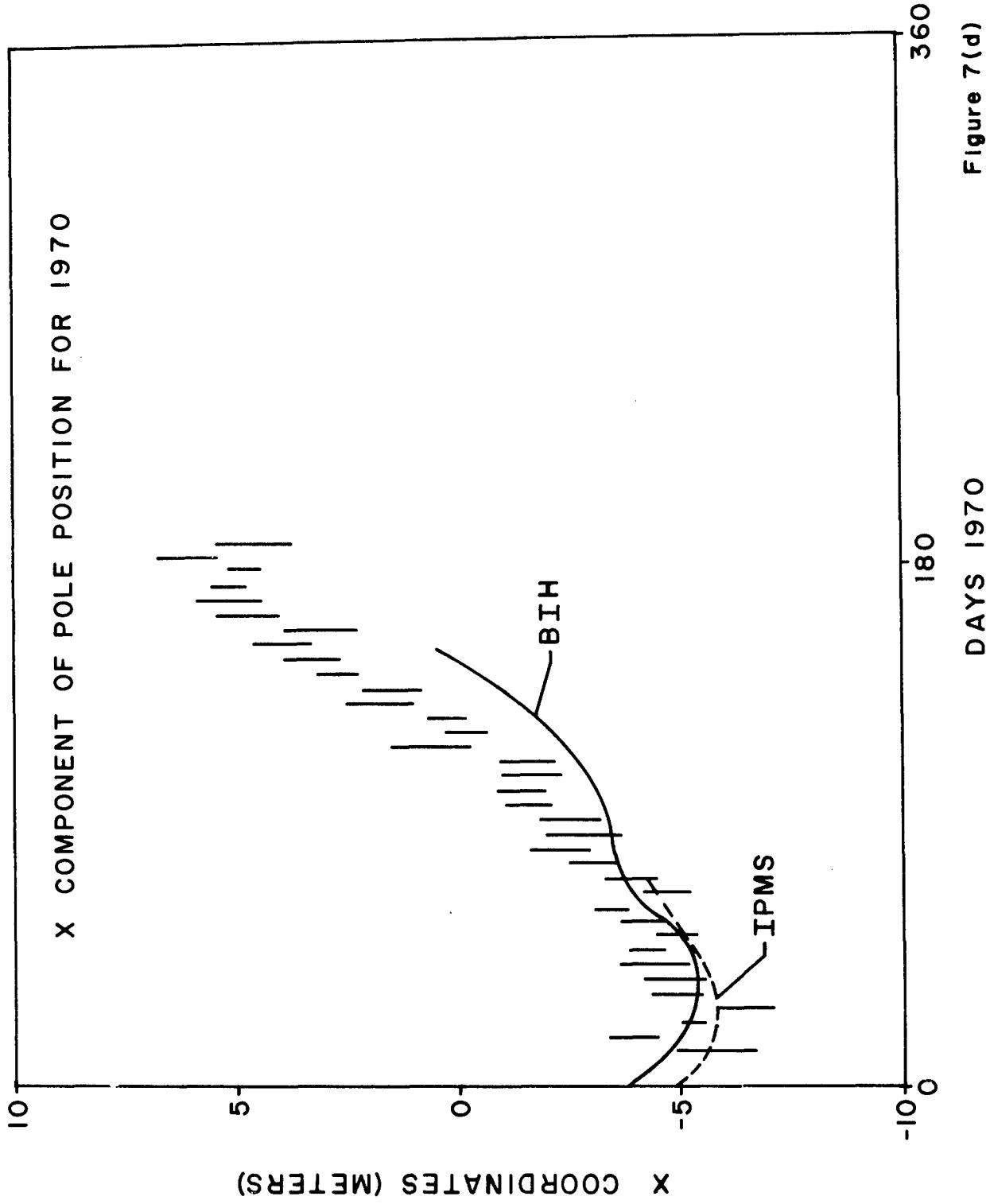


Figure 7 (c)



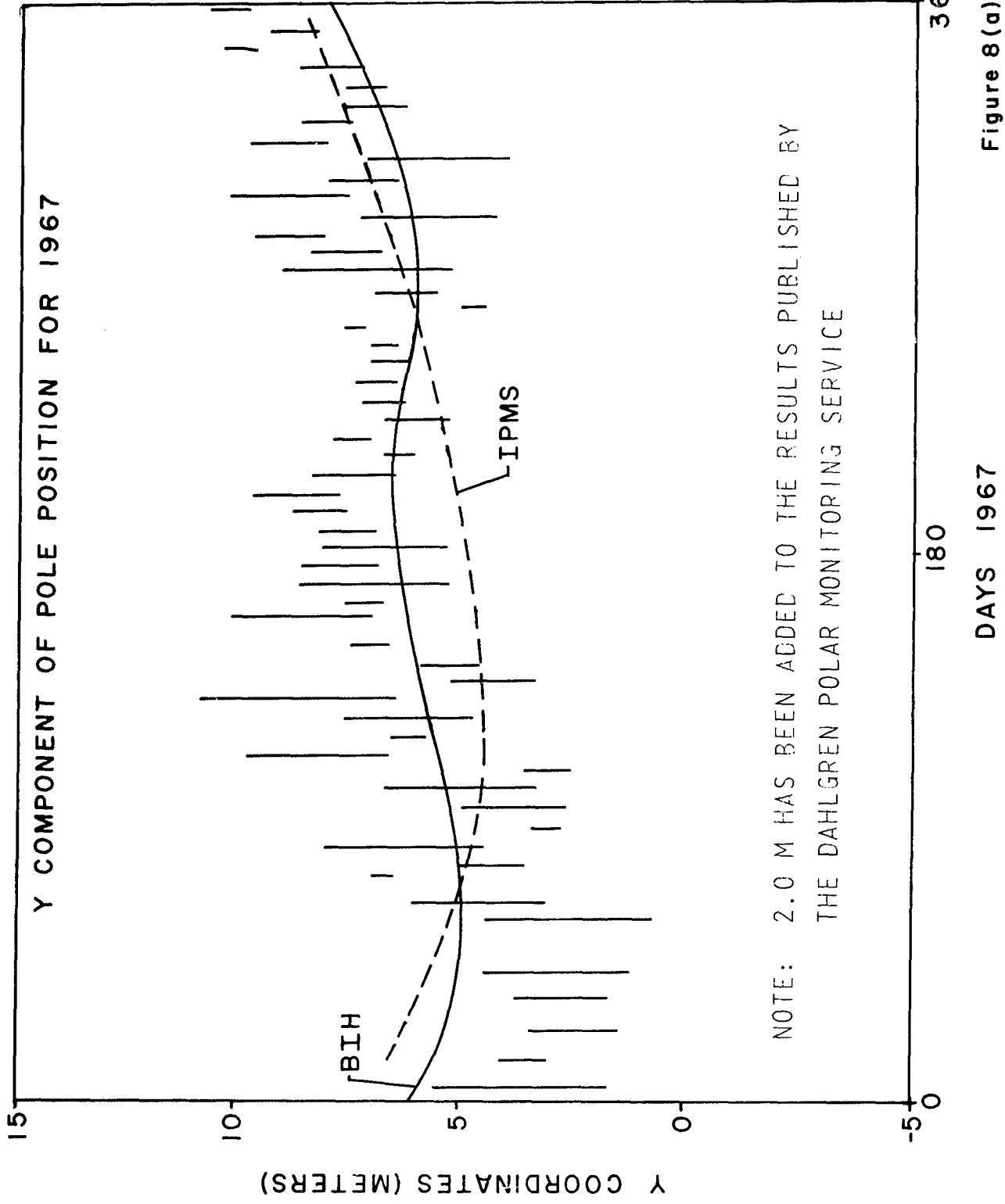


Figure 8 (a)

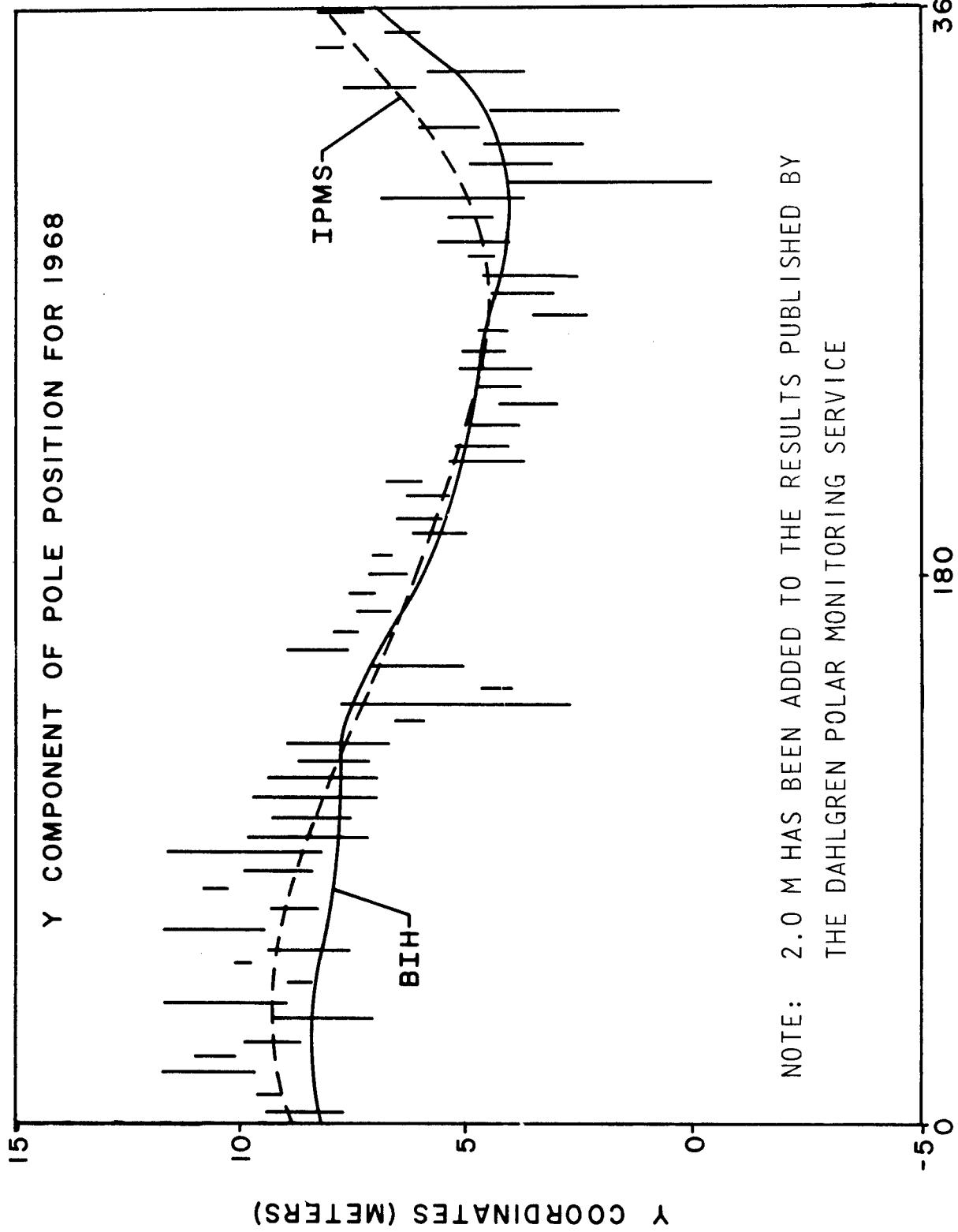


Figure 8 (b)

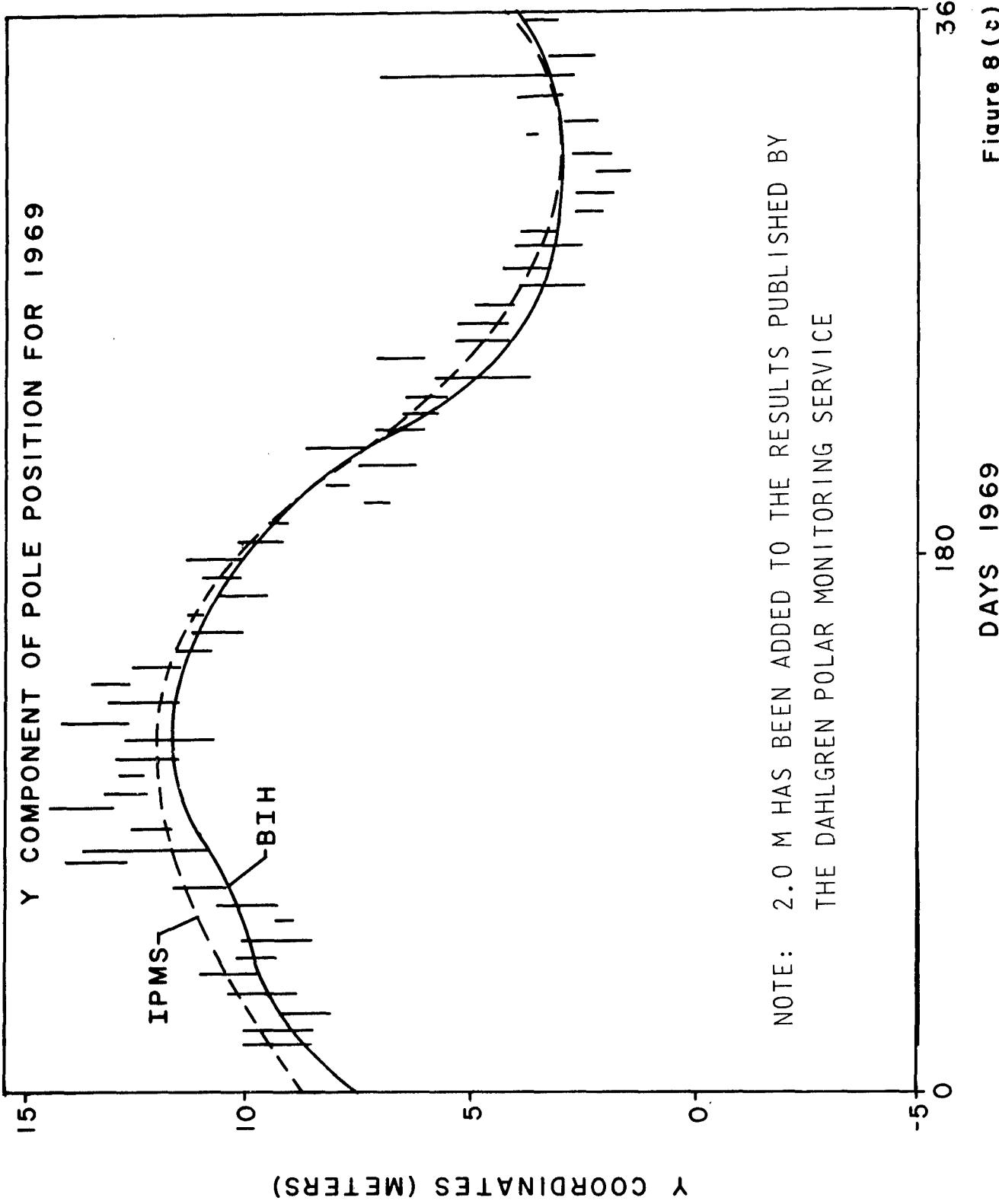
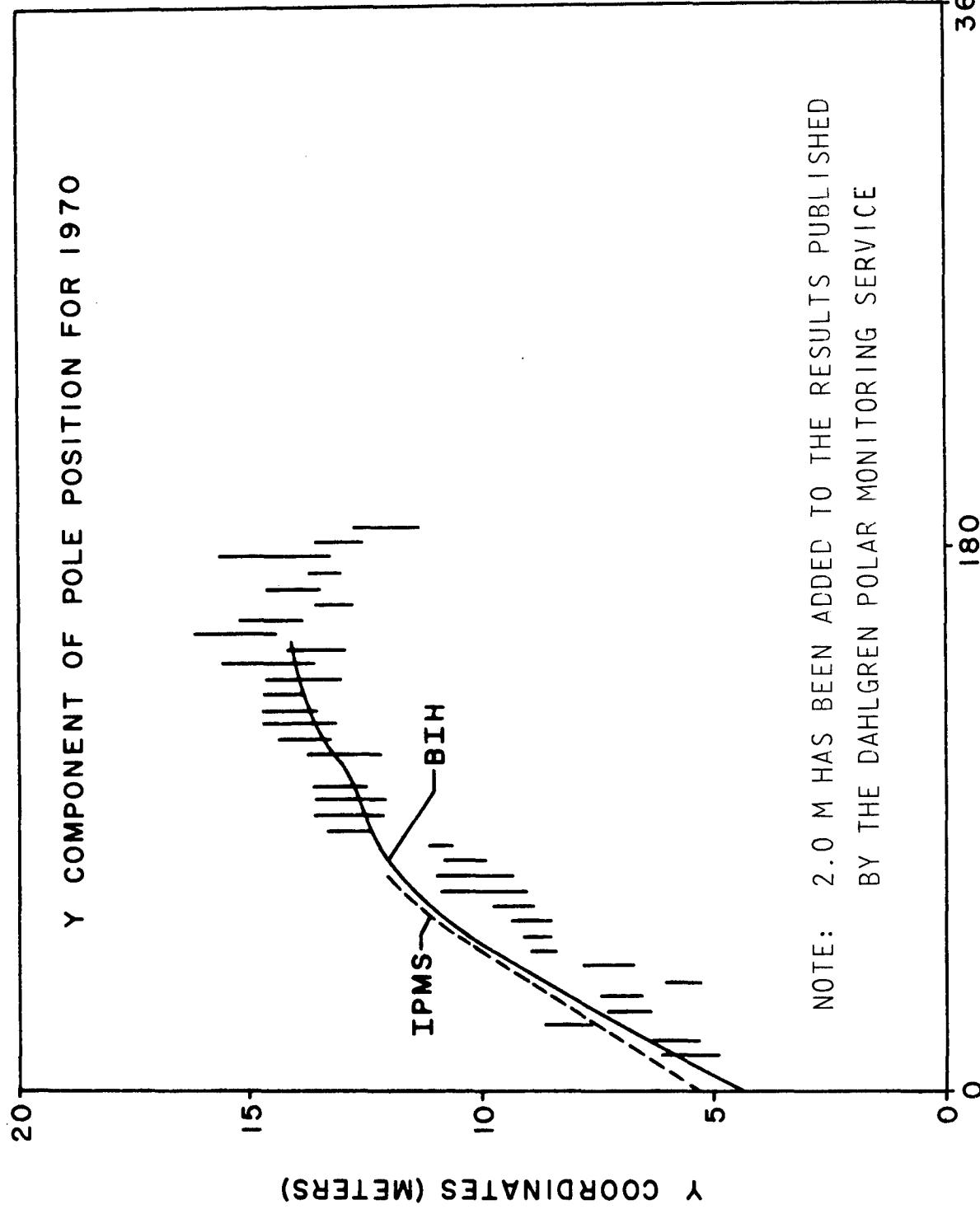


Figure 8 (c)



**Figure 8(p)**

POLAR MOTION FOR 1969

BASED ON DOPPLER OBSERVATIONS OF SATELLITES 1967 48A AND 1967 92A

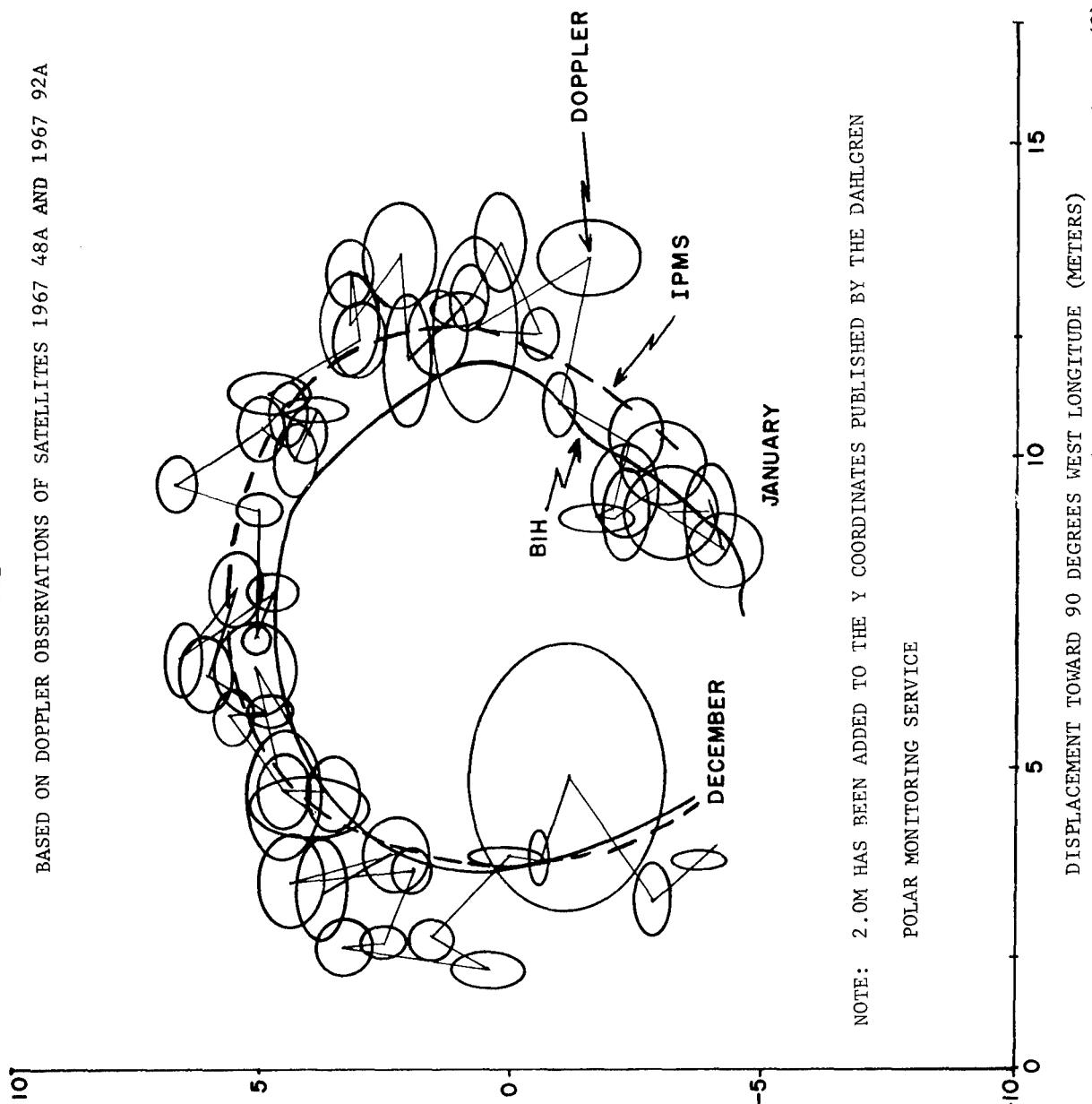


Figure (9)

## SUMMARY

The irregular motion of the earth's axis of rotation, known as Chandler Wobble, has been determined on the basis of Doppler observations of Navy Navigation Satellites. Measurement precisions of about 0.5 meters have been obtained for averaging times of six days. Agreement with astronomical determinations is better than one meter over the last two years. The discrepancies are no larger than differences between results for different groups of observatories as reported by the Bureau International de L'Heure and by the International Polar Motion Service.

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**APPENDIX A**

**Table 1**

TABLE 1

REPORT 0 REVISION 0  
DAHLGREN POLAR MONITORING SERVICE

		POLE POSITION		STANDARD ERROR		SATELLITE
DAY	1967	X METERS	Y METERS	X METERS	Y METERS	
1	2	4.47	5.97	1.76	1.91	1966-76A
3	4	9.27	1.69	1.71	1.85	
5	6	9.74	4.15	1.74	1.78	
7	8	7.48	1.00	2.78	2.98	
9	10	14.98	-5.16	2.00	2.54	
MEAN	1	10	9.19	1.53	2.00	2.21
STD DEV	1	10	3.84	4.23		
STD ERR	1	10	1.72	1.89		
11	12	7.51	-.66	1.86	1.89	
13	14	5.70	1.63	1.83	1.84	
15	16	5.49	2.14	1.43	1.52	
17	18	7.76	2.33	1.56	1.46	
19	20	10.92	2.15	1.41	1.41	
MEAN	11	20	7.48	1.52	1.62	1.62
STD DEV	11	20	2.18	1.25		
STD ERR	11	20	0.98	0.56		
21	22	9.62	1.65	1.55	1.47	
23	24	7.82	1.85	1.75	1.66	
25	26	6.77	-.73	2.25	2.18	
27	28	3.95	-2.95	2.32	2.13	
29	30	3.55	2.06	1.53	1.48	
MEAN	21	30	6.34	0.38	1.88	1.78
STD DEV	21	30	2.58	2.17		
STD ERR	21	30	1.15	0.97		
31	32	4.93	-2.25	1.93	1.97	
33	34	7.66	1.73	1.55	1.44	
35	36	5.68	0.78	1.24	1.16	
37	38	7.53	-.24	1.56	1.42	
39	40	9.15	3.37	1.67	1.56	
MEAN	31	40	6.99	0.68	1.59	1.51
STD DEV	31	40	1.69	2.11		
STD ERR	31	40	0.75	0.94		
41	42	8.65	6.47	1.86	1.77	
43	44	3.52	-.33	1.53	1.44	
45	46	2.86	-2.18	1.61	1.52	
47	48	2.54	-2.20	1.92	1.78	
49	50	4.69	2.46	1.78	1.67	
MEAN	41	50	4.45	0.84	1.74	1.64
STD DEV	41	50	2.49	3.68		
STD ERR	41	50	1.11	1.64		

REPORT 0 REVISION 0  
DAHLGREN POLAR MONITORING SERVICE

DAYS	1967	POLE POSITION		STANDARD ERROR		SATELLITE 1966-76A
		X METERS	Y METERS	X METERS	Y METERS	
MEAN	59	68	2.17	0.06	2.17	2.31
STD DEV	59	68	2.89	-.11	1.92	1.95
STD ERR	59	68	2.48	-1.93	2.22	2.20
MEAN	59	68	4.85	3.76	1.76	1.93
STD DEV	59	68	4.49	0.44	1.56	1.53
STD ERR	59	68	3.38	0.44	1.93	1.98
MEAN	69	78	4.44	2.05	1.94	1.96
STD DEV	69	78	3.25	5.54	1.88	2.00
STD ERR	69	78	1.99	4.88	1.81	1.90
MEAN	69	78	-.66	4.83	1.86	1.88
STD DEV	69	78	0.17	4.46	1.95	1.96
STD ERR	69	78	1.84	4.35	1.89	1.94
MEAN	79	88	2.61	2.56	1.94	1.96
STD DEV	79	88	1.95	0.99	1.61	1.69
STD ERR	79	88	5.33	3.10	1.52	1.75
MEAN	79	88	4.11	2.77	1.70	2.04
STD DEV	79	88	5.86	7.70	2.33	2.37
STD ERR	79	88	3.97	3.42	1.82	1.96
MEAN	89	98	1.69	2.52		
STD DEV	89	98	0.75	1.13		
MEAN	89	98	2.53	1.96	2.04	2.30
STD DEV	89	98	1.19	0.84	1.65	1.75
STD ERR	89	98	-.13	0.66	1.48	1.70
MEAN	89	98	1.77	1.60	1.97	2.21
STD DEV	89	98	2.79	0.72	1.86	2.01
STD ERR	89	98	1.63	1.16	1.80	1.99
MEAN	99	108	1.17	0.59		
STD DEV	99	108	0.52	0.26		
MEAN	99	100	3.01	0.39	1.77	2.02
STD DEV	99	102	8.32	4.01	1.83	2.20
STD ERR	99	104	4.39	6.43	1.69	1.93
MEAN	99	106	3.49	1.54	1.83	2.25
STD DEV	99	108	5.19	0.87	1.86	2.30
STD ERR	99	108	4.88	2.65	1.80	2.14
MEAN	99	108	2.10	2.53		
STD DEV	99	108	0.94	1.13		

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DAHLGREN POLAR MONITORING SERVICE

			POLE POSITION	STANDARD ERROR	SATELLITE		
DAYS	1967	X METERS	Y METERS	X METERS	Y METERS		
MEAN	109	110	1.46	0.48	1.64	1.92	1966-76A
STD DEV	109	118	3.48	2.26	1.52	1.83	
STD ERR	109	118	5.66	0.58	1.76	2.16	
MEAN	111	112	4.36	2.98	1.90	2.32	
STD DEV	111	114	6.90	6.82	2.11	2.53	
STD ERR	111	116	0.93	1.15	1.79	2.15	
MEAN	117	118	4.37	2.62			
STD DEV	109	118	2.08	2.58			
STD ERR	109	118					
MEAN	119	120	3.93	8.63	1.81	2.05	
STD DEV	121	122	1.91	4.87	1.71	2.21	
STD ERR	123	124	2.34	4.04	1.71	2.35	
MEAN	125	126	3.31	3.41	1.99	2.67	
STD DEV	127	128	2.26	1.53	1.77	2.08	
STD ERR	119	128	2.75	4.50	1.80	2.27	
MEAN	119	128	0.84	2.62			
STD DEV	119	128	0.38	1.17			
MEAN	129	130	0.51	4.31	1.72	2.22	
STD DEV	131	132	0.93	6.53	1.61	2.06	
STD ERR	133	134	1.77	10.85	1.43	1.66	
MEAN	135	136	-1.47	5.84	1.51	1.82	
STD DEV	137	138	3.96	3.05	1.68	1.93	
STD ERR	129	138	1.14	6.12	1.59	1.94	
MEAN	129	138	1.97	2.97			
STD DEV	129	138	0.88	1.33			
MEAN	139	140	3.70	4.15	1.84	2.12	
STD DEV	141	142	2.05	1.66	2.23	2.46	
STD ERR	143	144	0.64	0.99	2.13	2.37	
MEAN	145	146	1.44	2.05	2.09	2.51	
STD DEV	147	148	1.36	2.90	1.93	2.24	
STD ERR	139	148	1.84	2.35	2.04	2.34	
MEAN	139	148	1.15	1.22			
STD DEV	139	148	0.52	0.55			
MEAN	149	150	2.17	4.35	2.24	2.71	
STD DEV	151	152	0.67	5.50	2.03	2.39	
STD ERR	153	154	-3.09	4.97	2.23	2.62	
MEAN	155	156	-1.07	4.48	1.83	2.04	
STD DEV	157	158	1.06	1.18	1.96	2.24	
STD ERR	149	158	-.05	4.10	2.06	2.40	
MEAN	149	158	2.06	1.69			
STD DEV	149	158	0.92	0.76			
STD ERR	149	158					

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DAHlgREN PCLEAR MONITORING SERVICE

			PCLE PCSITION		STANDARD ERROR		
	DAYS	1967	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	159	160	2.43	4.82	1.62	2.06	59
STD DEV	161	162	-.74	8.00	1.72	1.92	59
STD ERR	159	161	0.84	6.41	1.67	1.99	
	159	161	2.24	2.25	0.07	0.10	
	159	161	1.58	1.59			
MEAN	163	164	1.34	5.10	1.90	2.27	59
STD DEV	165	166	1.11	5.83	1.56	1.85	59
STD ERR	167	168	0.63	4.39	1.51	1.68	59
MEAN	163	167	1.03	5.11	1.66	1.93	
STD DEV	163	167	0.36	0.72	0.21	0.30	
STD ERR	163	167	0.21	0.41			
MEAN	169	170	-.67	2.44	1.57	1.73	59
STD DEV	171	172	0.18	4.08	1.85	2.17	59
STD ERR	173	174	-.60	8.07	1.88	2.27	59
MEAN	169	173	-.36	4.86	1.76	2.06	
STD DEV	169	173	0.47	2.90	0.17	0.29	
STD ERR	169	173	0.27	1.67			
MEAN	175	176	-.77	7.04	1.36	1.60	59
STD DEV	177	178	0.88	5.19	1.35	1.68	59
STD ERR	179	180	4.65	4.31	1.92	2.07	59
MEAN	175	179	1.59	5.51	1.55	1.79	
STD DEV	175	179	2.78	1.39	0.33	0.25	
STD ERR	175	179	1.61	0.80			

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DAHLGREN POLAR MONITORING SERVICE

			PCLE POSITION		STANDARD ERR CR		
			X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	181	182	0.58	1.83	1.71	2.05	59
STD DEV	183	184	2.91	5.92	1.72	1.87	59
STD ERR	185	186	-0.21	5.84	1.62	1.95	59
MEAN	181	185	1.09	4.53	1.68	1.96	
STD DEV	181	185	1.62	2.34	0.05	0.09	
STD ERR	181	185	0.94	1.35			
MEAN	187	188	-0.55	6.65	1.41	1.61	59
STD DEV	189	190	0.28	4.60	1.77	1.89	59
STD ERR	191	192	1.21	5.24	1.74	2.20	59
MEAN	187	191	0.31	5.50	1.64	1.90	
STD DEV	187	191	0.88	1.05	0.20	0.29	
STD ERR	187	191	0.51	0.61			
MEAN	193	194	-0.74	6.14	1.36	1.50	59
STD DEV	195	196	1.04	7.25	1.33	1.42	59
STD ERR	197	198	0.99	5.18	1.71	1.90	59
MEAN	193	197	0.43	6.19	1.47	1.61	
STD DEV	193	197	1.01	1.03	0.21	0.26	
STD ERR	193	197	0.58	0.60			
MEAN	199	200	1.50	7.97	1.90	2.08	59
STD DEV	201	202	1.15	4.59	1.48	1.57	59
STD ERR	203	204	0.43	6.96	1.36	1.56	59
MEAN	199	203	1.02	6.50	1.58	1.74	
STD DEV	199	203	0.55	1.73	0.29	0.30	
STD ERR	199	203	0.32	1.00			

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DAHLGREN PCLAR MONITORING SERVICE

			PCLE PCSITCN	STANDARD ERRCR			
	DAY	1967	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	205	206	3.09	6.64	1.50	1.87	59
STD DEV	207	208	5.04	3.35	1.84	2.14	59
STD ERR	209	210	-.87	5.87	1.56	1.64	59
MEAN	205	209	2.42	5.29	1.63	1.88	
STD DEV	205	209	3.01	1.72	0.18	0.25	
STD ERR	205	209	1.74	0.99			
MEAN	211	212	-.50	4.26	1.90	1.91	59
STD DEV	213	214	-.08	4.23	1.78	1.67	59
STD ERR	215	216	-.30	4.63	1.49	1.58	59
MEAN	211	215	-.29	4.37	1.73	1.72	
STD DEV	211	215	0.21	0.22	0.21	0.17	
STD ERR	211	215	0.12	0.13			
MEAN	217	218	1.64	5.10	1.61	1.52	59
STD DEV	219	220	2.45	6.11	1.55	1.46	59
STD ERR	221	222	1.70	4.87	1.03	1.05	59
MEAN	217	221	1.93	5.36	1.40	1.34	
STD DEV	217	221	0.46	0.66	0.32	0.26	
STD ERR	217	221	0.26	0.38			
MEAN	223	224	3.41	4.17	1.19	1.32	59
STD DEV	225	226	1.11	2.62	1.35	1.32	59
STD ERR	227	228	0.68	5.21	1.32	1.37	59
MEAN	223	227	1.73	4.00	1.29	1.34	
STD DEV	223	227	1.47	1.30	0.09	0.03	
STD ERR	223	227	0.85	0.75			

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DAHLGREN PCLEAR MONITORING SERVICE

			PCLE POSITION		STANDARD ERROR		
			X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	229	230	1.72	5.14	1.14	1.10	59
STD DEV	229	232	1.54	3.69	1.27	1.18	59
STD ERR	229	234	-0.73	5.24	1.15	1.13	59
			0.84	4.69	1.19	1.14	
MEAN	229	233	1.36	0.87	0.07	0.04	
STD DEV	229	233	0.79	0.50			
MEAN	235	236	3.40	4.46	1.25	1.16	59
STD DEV	235	238	2.30	5.71	1.20	1.14	59
STD ERR	235	240	2.09	4.36	1.30	1.20	59
MEAN	235	239	2.60	4.84	1.25	1.17	
STD DEV	235	239	0.70	0.75	0.05	0.03	
STD ERR	235	239	0.41	0.43			
MEAN	241	242	2.03	5.45	1.15	1.14	59
STD DEV	241	244	-0.22	4.40	1.55	1.48	59
STD ERR	241	246	2.13	4.22	1.34	1.23	59
MEAN	241	245	1.31	4.69	1.35	1.28	
STD DEV	241	245	1.33	0.67	0.20	0.17	
STD ERR	241	245	0.77	0.38			
MEAN	247	248	2.96	4.89	1.24	1.22	59
STD DEV	247	250	2.82	4.63	1.04	1.14	59
STD ERR	247	251	1.68	4.36	1.02	0.93	59
MEAN	247	251	2.49	4.63	1.10	1.10	
STD DEV	247	251	0.70	0.26	0.12	0.15	
STD ERR	247	251	0.40	0.15			

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DAHLGREN POLAR MONITORING SERVICE

			PCLE POSITION	STANDARD ERROR			
DAYS	1967		X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	253	254	0.64	5.76	1.53	1.47	59
STD DEV	253	256	-.55	4.88	1.62	1.64	59
STD ERR	257	258	-1.50	5.53	2.16	2.11	59
MEAN	253	257	-.47	5.39	1.77	1.74	
STD DEV	253	257	1.07	0.46	0.34	0.33	
STD ERR	253	257	0.62	0.26			
MEAN	259	260	1.20	2.29	2.22	2.22	59
STD DEV	261	262	2.22	2.88	1.85	1.81	59
STD ERR	263	264	2.27	3.07	1.84	1.85	59
MEAN	259	263	1.90	2.74	1.97	1.96	
STD DEV	259	263	0.60	0.41	0.22	0.23	
STD ERR	259	263	0.35	0.23			
MEAN	265	266	0.50	5.48	1.81	1.72	59
STD DEV	267	268	0.87	3.70	2.11	1.97	59
STD ERR	269	270	-.52	3.22	2.45	2.45	59
MEAN	265	269	0.28	4.13	2.13	2.05	
STD DEV	265	269	0.72	1.19	0.32	0.37	
STD ERR	265	269	0.42	0.69			
MEAN	271	272	1.24	1.36	2.22	2.05	59
STD DEV	273	274	-.86	5.82	2.20	2.16	59
STD ERR	275	276	4.06	7.83	2.50	2.46	59
MEAN	271	275	1.48	5.01	2.31	2.23	
STD DEV	271	275	2.47	3.31	0.17	0.21	
STD ERR	271	275	1.43	1.91			

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DAHLGREN PCLAR MONITORING SERVICE

			PCLE POSITION	STANDARD ERROR			
			X METERS	Y METERS	SATELLITE		
MEAN	277	278	-1.45	6.35	2.39	2.52	59
STD DEV	277	280	-2.26	3.70	2.59	2.42	59
STD ERR	277	281	2.86	6.52	2.33	2.36	59
			-.28	5.52	2.44	2.43	
MEAN	277	281	2.75	1.58	0.14	0.08	
STD DEV	277	281	1.59	0.91			
MEAN	283	284	2.38	5.81	2.15	2.19	59
STD DEV	283	286	-2.01	6.06	2.33	2.30	59
STD ERR	283	287	0.16	8.32	2.51	2.60	59
MEAN	283	287	0.18	6.73	2.33	2.36	
STD DEV	283	287	2.20	1.38	0.18	0.21	
STD ERR	283	287	1.27	0.80			
MEAN	289	290	-2.59	6.25	2.38	2.55	59
STD DEV	289	292	-1.75	1.08	2.66	2.78	59
STD ERR	289	293	-1.49	3.34	2.46	2.61	59
MEAN	289	293	-1.94	3.56	2.50	2.65	
STD DEV	289	293	0.57	2.59	0.15	0.12	
STD ERR	289	293	0.33	1.49			
MEAN	295	296	-2.92	4.18	2.56	2.76	59
STD DEV	295	298	-.67	7.30	2.19	2.40	59
STD ERR	295	299	-.33	8.62	1.99	2.13	59
MEAN	295	299	-1.31	6.70	2.25	2.43	
STD DEV	295	299	1.41	2.28	0.29	0.32	
STD ERR	295	299	0.81	1.32			

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			PCLE PCSITION	STANDARD ERRCR	SATELLITE
MEAN	301	305	X METERS	Y METERS	
STD DEV	301	305	2.48	1.33	2.69
STD ERR	301	305	1.43	0.77	0.35
MEAN	307	311	-1.20	0.66	2.59
STD DEV	307	311	0.65	3.36	2.45
STD ERR	307	311	-.72	6.32	2.69
MEAN	307	311	-.42	3.44	2.57
STD DEV	307	311	0.96	2.83	0.12
STD ERR	307	311	0.55	1.64	
MEAN	313	314	-3.75	6.11	2.65
STD DEV	313	314	-1.98	8.49	3.01
STD ERR	313	314	2.81	5.87	2.32
MEAN	313	317	-.97	6.83	2.66
STD DEV	313	317	3.40	1.45	0.35
STD ERR	313	317	1.96	0.84	
MEAN	319	320	-1.67	5.05	2.60
STD DEV	319	320	-.57	7.02	2.19
STD ERR	319	320	-.70	6.09	2.44
MEAN	319	323	-.98	6.05	2.41
STD DEV	319	323	0.60	0.99	0.21
STD ERR	319	323	0.35	0.57	

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			PCLE POSITION	STANDARD ERROR	
	DAYS	1967	X METERS	Y METERS	SATELLITE
MEAN	325	326	-.09	5.62	2.04
STD DEV	325	328	-.66	5.92	1.81
STD ERR	325	330	-1.43	3.77	2.08
MEAN	325	329	-.72	5.10	1.97
STD DEV	325	329	0.67	1.16	0.14
STD ERR	325	329	0.39	0.67	
MEAN	331	332	-.38	5.56	1.93
STD DEV	331	334	-.79	5.09	1.67
STD ERR	331	336	0.31	4.51	1.51
MEAN	331	335	-.29	5.05	1.70
STD DEV	331	335	0.55	0.53	0.21
STD ERR	331	335	0.32	0.30	
MEAN	337	338	-.94	5.67	1.67
STD DEV	337	340	-.19	7.11	1.84
STD ERR	337	342	1.42	4.97	2.21
MEAN	337	341	0.10	5.91	1.91
STD DEV	337	341	1.20	1.09	0.28
STD ERR	337	341	0.70	0.63	
MEAN	343	344	-.64	7.31	1.53
STD DEV	343	346	-2.55	8.91	1.37
STD ERR	343	347	-1.70	7.29	1.40
MEAN	343	347	-1.63	7.84	1.43
STD DEV	343	347	0.96	0.93	0.08
STD ERR	343	347	0.55	0.54	

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DAHLGREN POLAR MONITORING SERVICE

			POLAR POSITION		STANDARD ERROR		
	DAY	1967	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	349	350	- .58	5.65	1.79	2.16	59
STD DEV	351	352	-1.88	6.78	1.49	1.76	59
STD ERR	353	354	- .88	7.46	1.35	1.67	59
	349	353	-1.12	6.63	1.54	1.87	
	349	353	0.68	0.91	0.23	0.26	
	349	353	0.39	0.53			

MEAN	355	356	- .25	7.34	1.15	1.33	59
STD DEV	357	358	- .33	8.23	1.35	1.54	59
STD ERR	359	360	- .10	9.03	2.16	2.38	59
	355	359	- .23	8.20	1.55	1.75	
	355	359	0.11	0.84	0.54	0.56	
	355	359	0.07	0.49			

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DAHLGREN POLAR MONITORING SERVICE

		POLE POSITION		STANDARD ERROR		
DAYS 1968		X METERS	Y METERS	X METERS	Y METERS	SATELLITE
	1	2	1,20	5,09	1,43	1,63
	3	4	0,51	8,17	1,23	1,31
MEAN	5	6	4,02	6,20	1,98	2,25
STD DEV	1	5	1,11	6,49	1,55	1,73
STD ERR	1	5	2,66	1,56	0,39	0,48
			1,54	7,90		
	7	8	0,42	7,95	0,97	1,04
	9	10	1,34	6,83	0,89	0,94
MEAN	11	12	0,37	7,11	1,12	1,23
STD DEV	7	11	0,71	7,30	0,99	1,07
STD ERR	7	11	0,54	0,58	0,12	0,15
			0,31	0,34		
	13	14	1,85	7,57	1,28	1,37
	15	16	4,42	10,83	1,60	1,65
MEAN	17	18	0,85	7,65	1,96	1,85
STD DEV	13	17	2,37	8,68	1,61	1,62
STD ERR	13	17	1,84	1,86	0,34	0,24
			1,06	1,07		
	19	20	1,78	8,81	1,41	1,44
	21	22	2,40	8,97	1,73	1,61
MEAN	23	24	1,93	7,48	1,49	1,44
STD DEV	19	23	2,04	8,42	1,54	1,50
STD ERR	19	23	0,32	0,82	0,17	0,10
			0,19	0,47		

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		POLE POSITION		STANDARD ERROR		SATELLITE	
DAYS	1968	X METERS	Y METERS	X METERS	Y METERS		
	25	26	2,21	5,76	1,46	1,39	59
	27	28	2,88	7,77	1,44	1,35	59
	29	30	3,77	8,03	1,57	1,42	59
MEAN	25	29	2,95	7,19	1,49	1,38	
STD DEV	25	29	0,78	1,24	0,07	0,03	
STD ERR	25	29	0,45	0,72			
	33	34	1,67	7,15	1,60	1,44	59
	35	36	3,92	4,78	1,73	1,56	59
MEAN	33	35	2,79	5,96	1,66	1,50	
STD DEV	33	35	1,60	1,68	0,09	0,08	
STD ERR	33	35	1,13	1,19			
	37	38	4,10	10,73	1,89	1,70	59
	39	40	2,46	5,61	1,25	1,20	59
	41	42	2,56	8,12	1,32	1,18	59
MEAN	37	41	2,00	8,15	1,49	1,36	
STD DEV	37	41	2,36	2,56	0,35	0,29	
STD ERR	37	41	1,36	1,48			
	43	44	1,19	6,53	1,13	1,05	59
	45	46	0,53	6,34	1,33	1,26	59
	47	48	1,19	6,98	1,15	1,07	59
MEAN	43	47	0,97	6,62	1,20	1,13	
STD DEV	43	47	0,38	0,33	0,11	0,12	
STD ERR	43	47	0,22	0,19			

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DAHLGREN POLAR MONITORING SERVICE

			POLE POSITION		STANDARD ERROR		
	DAY	1968	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
	49	50	2,92	8,32	1,35	1,29	59
	51	52	2,48	7,78	1,26	1,22	59
	53	54	0,12	7,63	1,17	1,03	59
MEAN	49	53	1,84	7,91	1,26	1,18	
STD DEV	49	53	1,50	0,36	0,09	0,14	
STD ERR	49	53	0,87	0,21			
	55	56	2,03	7,63	1,24	1,23	59
	57	58	1,26	6,93	1,04	0,93	59
	59	60	2,53	4,41	1,34	1,25	59
MEAN	55	59	1,43	6,32	1,21	1,14	
STD DEV	55	59	1,49	1,69	0,15	0,18	
STD ERR	55	59	0,86	0,98			
	61	62	2,24	10,30	1,40	1,25	59
	63	64	0,44	8,35	1,16	1,08	59
	65	66	1,47	6,60	1,20	1,16	59
MEAN	61	65	1,38	8,42	1,25	1,17	
STD DEV	61	65	0,90	1,85	0,13	0,08	
STD ERR	61	65	0,52	1,07			
	67	68	*1,39	6,05	1,32	1,27	59
	69	70	0,51	6,35	1,20	1,22	59
	71	72	2,21	7,84	1,16	1,08	59
MEAN	67	71	0,44	6,75	1,23	1,19	
STD DEV	67	71	1,80	0,96	0,08	0,10	
STD ERR	67	71	1,04	0,55			

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DAHLGREN POLAR MONITORING SERVICE

		POLE POSITION		STANDARD ERROR		SATELLITE	
DAYS 1968		X METERS	Y METERS	X METERS	Y METERS		
	73	74	3,49	8,91	1,44	1,50	59
	75	76	1,28	8,33	1,17	1,09	59
	77	78	0,10	8,04	1,06	0,98	59
MEAN	73	77	1,62	8,43	1,23	1,19	
STD DEV	73	77	1,72	0,44	0,20	0,28	
STD ERR	73	77	0,99	0,25			
	79	80	0,22	6,07	1,95	1,81	59
	81	82	0,71	6,28	2,06	2,04	59
	83	84	3,95	8,65	2,09	1,99	59
MEAN	79	83	1,63	7,00	2,04	1,95	
STD DEV	79	83	2,03	1,43	0,07	0,12	
STD ERR	79	83	1,17	0,83			
	85	.86	5,29	11,39	2,49	2,18	59
	87	88	4,19	6,44	1,84	1,91	59
	89	90	0,87	5,62	1,57	1,55	59
MEAN	85	89	3,45	7,82	1,96	1,88	
STD DEV	85	89	2,30	3,12	0,47	0,32	
STD ERR	85	89	1,33	1,80			
	91	92	1,11	6,09	2,07	2,13	59
	93	94	8,40	4,62	2,20	2,58	59
	95	96	5,38	9,32	2,52	2,39	59
MEAN	91	95	4,97	6,68	2,26	2,37	
STD DEV	91	95	3,66	2,40	0,23	0,23	
STD ERR	91	95	2,11	1,39			

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		POLE POSITION		STANDARD ERROR		
DAYS 1969		X METERS	Y METERS	X METERS	Y METERS	SATELLITE
	97	98	6,32	7,08	2,02	2,05
	99	100	3,75	7,54	2,01	2,13
MEAN	101	102	2,46	4,56	2,22	2,48
STD DEV	97	101	1,97	1,60	0,12	0,22
STD ERR	97	101	1,14	0,92		0,23
	103	104	2,27	8,39	2,11	2,02
	105	106	5,44	3,65	2,76	3,06
MEAN	107	108	7,55	6,75	2,17	2,39
STD DEV	103	107	5,09	6,26	2,35	2,49
STD ERR	103	107	2,66	2,40	0,36	0,53
			1,54	1,39		
	109	110	6,02	8,54	2,45	2,43
	111	112	5,59	5,38	2,32	2,49
MEAN	113	114	2,85	4,43	2,47	2,54
STD DEV	109	113	4,82	6,12	2,41	2,49
STD ERR	109	113	1,72	2,15	0,08	0,05
			0,99	1,24		
	115	116	3,85	6,70	2,55	2,98
	117	118	5,68	4,09	2,75	3,05
MEAN	119	120	4,95	6,89	2,22	2,63
STD DEV	115	119	4,82	5,89	2,51	2,89
STD ERR	115	119	0,92	1,57	0,27	0,23
			0,53	0,90		

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		POLE POSITION		STANDARD ERROR		SATELLITE
DAYS	1960	X METERS	Y METERS	X METERS	Y METERS	
MEAN						59
STD DEV						59
STD ERR						59
121	122	2,35	4,62	2,40	2,70	
123	124	1,70	4,45	2,32	2,60	
125	126	5,06	8,33	2,58	3,10	
121	125	3,04	5,80	2,43	2,80	
121	125	1,78	2,19	0,14	0,26	
121	125	1,03	1,27			
127	128	4,06	4,45	2,58	2,93	59
129	130	5,97	3,55	2,73	3,00	59
131	132	3,35	4,51	2,56	3,21	59
127	131	3,23	4,17	2,62	3,05	
127	131	3,25	0,54	0,10	0,15	
127	131	1,87	0,31			
133	134	0,27	6,06	2,56	2,95	59
135	136	4,22	5,30	2,01	2,75	59
137	138	3,12	-1,94	2,76	3,39	59
133	137	2,54	3,14	2,44	3,03	
133	137	2,04	4,41	0,39	0,33	
133	137	1,18	2,55			
139	140	6,16	1,60	2,36	2,74	59
141	142	5,01	2,66	2,15	2,63	59
143	144	4,92	2,44	2,63	2,96	59
139	143	5,36	2,23	2,38	2,78	
139	143	0,69	0,56	0,24	0,17	
139	143	0,40	0,32			

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		POLE POSITION		STANDARD ERROR		SATELLITE
	DAY	X METERS	Y METERS	X METERS	Y METERS	
	145	146	8,05	1,82	2,85	3,67 59
	147	148	2,19	5,09	0,90	1,09 59
	149	150	6,41	5,21	1,29	1,59 59
MEAN	145	149	5,55	4,04	1,68	2,12
STD DEV	145	149	3,02	1,92	1,03	1,37
STD ERR	145	149	1,75	1,11		
	151	152	4,80	7,47	1,08	1,30 59
	153	154	4,49	5,70	0,90	1,13 59
	155	156	3,87	4,96	1,35	1,56 59
MEAN	151	155	4,39	6,04	1,11	1,33
STD DEV	151	155	0,47	1,29	0,23	0,22
STD ERR	151	155	0,27	0,74		
	157	158	3,74	6,19	0,95	1,23 59
	159	160	3,71	5,20	0,97	1,18 59
	161	162	3,86	5,38	1,08	1,33 59
MEAN	157	161	3,77	5,59	1,00	1,25
STD DEV	157	161	0,08	0,53	0,07	0,07
STD ERR	157	161	0,05	0,30		
	163	164	2,77	5,59	1,10	1,28 59
	165	166	4,72	5,00	1,06	1,28 59
	167	168	1,91	4,35	0,95	1,16 59
MEAN	163	167	3,13	4,98	1,04	1,24
STD DEV	163	167	1,44	0,62	0,08	0,07
STD ERR	163	167	0,83	0,36		

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			POLE POSITION		STANDARD ERROR		
	MEAN	STD. DEV.	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	169	170	2,28	5,03	0,97	1,09	59
STD. DEV.	171	172	2,39	5,77	1,11	1,33	59
STD. ERR.	173	174	2,35	4,93	0,92	1,24	59
MEAN	169	173	2,34	5,24	1,00	1,22	
STD. DEV.	169	173	0,06	0,46	0,10	0,12	
STD. ERR.	169	173	0,03	0,26			
MEAN	175	176	2,16	5,40	0,97	1,12	59
STD. DEV.	177	178	3,83	4,07	0,93	1,03	59
STD. ERR.	179	180	2,56	4,74	0,89	1,08	59
MEAN	175	179	2,85	4,74	0,93	1,07	
STD. DEV.	175	179	0,87	0,67	0,04	0,05	
STD. ERR.	175	179	0,50	0,38			
MEAN	181	182	3,78	5,21	0,88	1,01	59
STD. DEV.	183	184	4,18	4,63	0,94	1,04	59
STD. ERR.	185	186	3,80	4,59	1,08	1,27	59
MEAN	181	185	3,92	4,81	0,96	1,11	
STD. DEV.	181	185	0,23	0,35	0,10	0,14	
STD. ERR.	181	185	0,13	0,20			
MEAN	187	188	3,60	3,90	0,91	1,02	59
STD. DEV.	189	190	3,22	4,31	0,80	0,92	59
STD. ERR.	191	192	2,75	2,32	0,98	1,06	59
MEAN	187	191	3,19	3,51	0,90	1,00	
STD. DEV.	187	191	0,43	1,05	0,09	0,07	
STD. ERR.	187	191	0,25	0,61			

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		POLE POSITION		STANDARD ERROR		SATELLITE
MEAN	STD. DEV.	X METERS	Y METERS	X METERS	Y METERS	
193	194	4,72	3,29	0,86	0,91	59
195	196	3,41	3,56	0,83	0,88	59
197	198	3,63	4,98	0,80	0,85	59
MEAN	193	197	3,92	3,95	0,83	0,88
STD. DEV.	193	197	0,70	0,91	0,03	0,03
STD. ERR.	193	197	0,40	0,52		
199	200	4,04	4,75	0,94	1,01	59
201	202	4,33	3,44	0,86	0,88	59
203	204	4,38	3,14	0,94	0,95	59
MEAN	199	203	4,25	3,78	0,91	0,94
STD. DEV.	199	203	0,18	0,85	0,04	0,06
STD. ERR.	199	203	0,10	0,49		
205	206	5,55	4,86	1,05	1,07	59
207	208	3,57	3,57	0,99	0,92	59
209	210	4,07	4,34	0,93	0,96	59
MEAN	205	209	4,40	4,26	0,99	0,98
STD. DEV.	205	209	1,03	0,65	0,06	0,07
STD. ERR.	205	209	0,60	0,38		
211	212	3,07	2,98	1,02	1,01	59
213	214	3,08	3,60	0,94	0,97	59
215	216	4,89	0,66	0,93	0,91	59
MEAN	211	215	3,68	2,42	0,96	0,96
STD. DEV.	211	215	1,05	1,55	0,05	0,05
STD. ERR.	211	215	0,61	0,90		

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		POLE POSITION		STANDARD ERROR		SATELLITE	
MEAN	STD DEV	STD ERR	DAY 1968	X METERS	Y METERS		
217	218	5,09	217	1,91	1,18	1,13	59
219	220	2,45	219	1,98	1,06	1,01	59
221	222	2,28	221	3,76	1,08	1,06	59
MEAN	221	3,27	221	2,55	1,11	1,07	
STD DEV	221	1,58	221	1,05	0,07	0,06	
STD ERR	221	0,91	221	0,61			
223	224	2,04	223	1,21	0,98	0,92	59
225	226	2,88	225	2,48	1,09	1,02	59
227	228	3,28	227	3,23	0,86	0,86	59
MEAN	227	2,73	227	2,30	0,98	0,94	
STD DEV	227	0,63	227	1,02	0,11	0,08	
STD ERR	227	0,36	227	0,59			
229	230	3,00	229	1,75	1,24	1,04	59
231	232	2,12	231	0,53	1,11	1,07	59
233	234	2,11	233	2,61	0,89	0,84	59
MEAN	233	2,41	233	1,63	1,08	0,98	
STD DEV	233	0,51	233	1,05	0,18	0,13	
STD ERR	233	0,30	233	0,60			
235	236	2,47	235	1,35	0,99	0,95	59
237	238	3,73	237	2,08	0,95	0,87	59
239	240	3,71	239	3,11	0,92	0,88	59
MEAN	239	3,30	239	2,18	0,95	0,90	
STD DEV	239	0,72	239	0,89	0,03	0,04	
STD ERR	239	0,42	239	0,51			

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		POLE POSITION		STANDARD ERROR		SATELLITE
DAY	1968	X METERS	Y METERS	X METERS	Y METERS	
	241	242	2,93	3,52	0,97	0,97
	243	244	4,02	2,41	0,99	0,99
	245	246	2,41	0,79	0,98	0,93
MEAN	241	245	3,12	2,24	0,98	0,96
STD DEV	241	245	0,82	1,37	0,01	0,03
STD ERR	241	245	0,47	0,79		
	247	248	1,78	3,60	0,91	0,87
	249	250	1,98	1,59	0,98	0,99
	251	252	3,35	2,56	1,02	1,02
MEAN	247	251	2,37	2,58	0,97	0,96
STD DEV	247	251	0,86	1,00	0,06	0,08
STD ERR	247	251	0,49	0,58		
	253	254	1,91	2,50	0,94	0,91
	255	256	0,90	2,80	0,96	0,96
	257	258	1,55	1,66	0,91	0,88
MEAN	253	257	1,45	2,32	0,94	0,92
STD DEV	253	257	0,51	0,59	0,03	0,04
STD ERR	253	257	0,30	0,34		
	259	260	2,59	0,63	1,02	0,99
	261	262	1,30	0,10	1,05	1,12
	263	264	3,00	2,04	0,89	0,95
MEAN	259	263	2,30	0,92	0,99	1,02
STD DEV	259	263	0,89	1,00	0,08	0,09
STD ERR	259	263	0,51	0,58		

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		POLE POSITION		STANDARD ERROR		SATELLITE	
MEAN	DAYS 1969	X METERS	Y METERS	X METERS	Y METERS		
MEAN	265	266	0,91	2,33	0,97	1,12	59
STD DEV	265	268	-1,68	2,26	1,16	1,30	59
STD ERR	265	270	0,66	0,32	1,10	1,11	59
MEAN	265	269	0,30	1,64	1,08	1,18	
STD DEV	265	269	0,86	1,14	0,09	0,11	
STD ERR	265	269	0,49	0,66			
MEAN	271	272	-0,10	-1,37	0,92	1,01	59
STD DEV	271	274	-1,56	1,52	0,98	1,11	59
STD ERR	271	276	2,81	2,92	0,85	0,92	59
MEAN	271	275	0,39	1,36	0,92	1,02	
STD DEV	271	275	2,23	1,65	0,06	0,10	
STD ERR	271	275	1,29	0,96			
MEAN	277	278	-1,65	2,82	1,26	1,39	59
STD DEV	277	280	-3,32	2,65	1,03	1,16	59
STD ERR	277	281	0,19	2,25	1,07	1,29	59
MEAN	277	281	-1,59	2,57	1,12	1,28	
STD DEV	277	281	1,76	0,29	0,12	0,12	
STD ERR	277	281	1,01	0,17			
MEAN	283	284	0,41	2,85	0,98	1,25	59
STD DEV	283	286	0,96	3,95	1,00	1,45	59
STD ERR	283	287	0,30	1,48	1,07	1,45	59
MEAN	283	287	0,56	2,76	1,02	1,38	
STD DEV	283	287	0,35	1,24	0,05	0,12	
STD ERR	283	287	0,20	0,72			

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		POLE POSITION		STANDARD ERROR		SATELLITE	
DAY	1968	X METERS	Y METERS	X METERS	Y METERS		
MEAN	289	290	-1.68	3.23	1.05	1.30	59
STD DEV	289	292	-3.83	1.90	1.06	1.23	59
STD ERR	289	294	-1.15	3.33	0.97	1.11	59
MEAN	289	293	-1.56	2.82	1.03	1.21	
STD DEV	289	293	1.99	0.80	0.05	0.10	
STD ERR	289	293	1.15	0.46			
MEAN	295	296	-1.40	2.62	1.06	1.25	59
STD DEV	295	298	0.82	0.62	1.27	1.83	59
STD ERR	295	300	0.53	6.34	0.99	1.51	59
MEAN	295	299	0.32	3.19	1.11	1.53	
STD DEV	295	299	0.63	2.90	0.15	0.29	
STD ERR	295	299	0.37	1.68			
MEAN	301	302	-2.60	4.28	1.05	1.49	59
STD DEV	301	304	-2.36	-1.98	1.23	1.77	59
STD ERR	301	306	-2.09	-3.02	0.93	1.39	59
MEAN	301	305	-2.35	-1.24	1.07	1.55	
STD DEV	301	305	0.25	3.95	0.15	0.20	
STD ERR	301	305	0.15	2.28			
MEAN	307	308	-1.29	0.56	1.27	1.60	59
STD DEV	307	310	-1.87	1.37	1.06	1.26	59
STD ERR	307	312	-1.43	3.86	0.93	1.25	59
MEAN	307	311	-1.86	1.93	1.09	1.37	
STD DEV	307	311	0.88	1.72	0.17	0.20	
STD ERR	307	311	0.51	0.99			

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		POLE POSITION		STANDARD ERROR			
	DAY	X METERS	Y METERS	X METERS	Y METERS	SATELLITE	
MEAN	313	314	-0.91	1.91	0.91	1.15	59
	315	316	-2.57	1.55	1.05	1.36	59
	317	318	-1.96	3.04	0.89	1.18	59
	313	317	-1.81	1.47	0.95	1.23	
STD DEV	313	317	0.84	1.83	0.09	0.12	
	313	317	0.48	1.06			
MEAN	319	320	-1.16	4.15	1.07	1.34	59
	321	322	-1.60	3.58	0.86	1.09	59
	323	324	-2.03	2.05	0.93	1.17	59
	319	323	-1.60	3.26	0.95	1.20	
STD DEV	319	323	0.43	1.09	0.11	0.13	
	319	323	0.25	0.63			
MEAN	325	326	0.98	-1.83	0.88	1.07	59
	327	328	-2.86	-1.32	0.95	1.19	59
	329	330	-1.86	3.76	0.88	1.03	59
	325	329	-1.25	0.87	0.90	1.10	
STD DEV	325	329	1.99	2.52	0.04	0.09	
	325	329	1.15	1.45			
MEAN	331	332	-2.74	3.25	1.11	1.37	59
	333	334	-2.98	5.90	0.88	1.09	59
	335	336	-4.29	5.13	1.28	1.32	59
	331	335	-3.34	4.76	1.09	1.26	
STD DEV	331	335	0.83	1.36	0.20	0.15	
	331	335	0.48	0.79			

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DAHLGREN POLAR MONITORING SERVICE

DAYS	1968	POLE POSITION		STANDARD ERROR		SATELLITE
		X METERS	Y METERS	X METERS	Y METERS	
337	338	-3.53	1.35	1.11	1.34	59
339	340	-4.19	1.62	1.19	1.41	59
341	342	-3.18	4.99	1.24	1.37	59
MEAN	341	-3.63	2.65	1.18	1.38	
STD DEV	341	0.51	2.03	0.07	0.04	
STD ERR	341	0.29	1.17			

MEAN	343	344	-2,15	6,21	1,39	1,54	59
STD DEV	345	346	-2,63	5,43	1,09	1,23	59
STD ERR	347	348	-2,83	5,56	1,19	1,36	59
MEAN	343	347	-2,54	5,74	1,22	1,38	
STD DEV	343	347	0,35	0,42	0,15	0,16	
STD ERR	343	347	0,20	0,24			

MEAN	349	350	2,66	3,86	1,13	1,29	59
STD DEV	351	352	1,99	3,85	1,06	1,10	59
STD ERR	353	354	1,94	5,10	0,87	0,98	59
MEAN	349	353	1,87	4,27	1,02	1,12	
STD DEV	349	353	0,84	0,72	0,13	0,16	
STD ERR	349	353	0,48	0,42			

	355	356	4,37	5,01	0,99	1,08	59
	357	358	4,68	6,79	1,05	1,11	59
	359	360	4,54	5,32	1,32	1,47	59
MEAN	355	359	4,53	5,71	1,12	1,22	
STD DEV	355	359	1,59	0,95	0,17	0,22	
STD ERR	355	359	0,92	0,55			

MEAN	361	362	"2,40	5,98	1,14	1,18	59
	363	364	"2,50	5,92	0,98	0,98	59
STD DEV	361	363	"2,45	5,95	1,06	1,08	
STD ERR	361	363	0,07	0,04	0,11	0,14	
	361	363	0,05	0,03			

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DAHLGREN POLAR MONITORING SERVICE

			POLE POSITION		STANDARD ERROR		SATELLITE		
MEAN	STD DEV	STD ERR	DAY	1969	X METERS	Y METERS			
			15	16	-5.24	6.20	1.14	1.05	59
			16	17	-3.74	5.77	1.52	1.66	60
			17	18	-2.88	6.99	0.95	0.90	59
			18	19	-3.78	9.38	1.17	1.26	60
MEAN	15	18	19	18	-3.91	7.08	1.19	1.22	
STD DEV	15	18			0.98	1.61	0.24	0.33	
STD ERR	15	18			0.49	0.81			
			19	20	-.29	5.52	1.00	0.96	59
			20	21	-5.85	4.45	1.14	1.27	60
			21	22	-5.98	7.19	1.19	1.21	59
			22	23	-3.17	9.46	1.17	1.25	60
			23	24	-1.11	8.95	1.12	1.16	59
			24	25	-2.04	7.05	1.20	1.26	60
MEAN	19	24	19	24	-3.07	7.10	1.14	1.18	
STD DEV	19	24			2.40	1.92	0.07	0.12	
STD ERR	19	24			0.98	0.79			
			25	26	-1.14	4.96	1.01	1.06	59
			26	27	-2.55	7.64	1.06	1.15	60
			27	28	-4.25	7.42	1.33	1.36	59
			28	29	-5.58	6.76	1.43	1.43	60
			29	30	-5.19	7.82	1.17	1.14	59
			30	31	-6.44	4.28	1.26	1.44	60
MEAN	25	30	25	30	-4.19	6.48	1.21	1.26	
STD DEV	25	30			2.00	1.50	0.16	0.17	
STD ERR	25	30			0.82	0.61			
			31	32	-2.14	6.77	0.89	0.89	59
			32	33	-4.18	4.50	1.34	1.54	60
			33	34	0.27	10.06	1.29	1.27	59
			34	35	-3.14	7.71	1.14	1.26	60
			35	36	-1.20	8.80	0.97	0.95	59
			36	37	-2.80	7.18	1.17	1.33	60
MEAN	31	36	31	36	-2.20	7.50	1.13	1.21	
STD DEV	31	36			1.57	1.89	0.18	0.24	
STD ERR	31	36			0.64	0.77			

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DAHLGREN POLAR MONITORING SERVICE

			POLE POSITION		STANDARD ERROR	
DAYS	1969	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
	37	38	-.43	10.27	1.72	1.72
	38	39	-3.42	8.62	1.38	1.54
	39	40	-1.51	9.44	1.47	1.51
	40	41	-2.73	8.77	1.31	1.58
	41	42	-3.57	6.56	1.26	1.33
	42	43	-3.05	5.70	1.51	1.67
MEAN	37	42	-2.45	8.23	1.44	1.56
STD DEV	37	42	1.23	1.75	0.17	0.14
STD ERR	37	42	0.50	0.71		
	43	44	-2.56	8.22	1.20	1.27
	44	45	-3.01	5.93	1.43	1.63
	45	46	-.95	7.48	1.17	1.19
	46	47	-4.49	7.75	1.21	1.39
	47	48	-1.43	7.75	1.31	1.24
	48	49	-5.17	8.47	1.35	1.52
MEAN	43	48	-2.93	7.60	1.28	1.37
STD DEV	43	48	1.66	0.89	0.10	0.17
STD ERR	43	48	0.68	0.36		
	49	50	-3.71	7.51	1.32	1.32
	50	51	-.61	9.79	1.49	1.73
	51	52	-2.56	7.84	1.14	1.06
	52	53	-2.83	7.12	1.70	2.04
	53	54	-1.45	5.13	1.09	0.98
	54	55	-2.17	5.23	1.46	1.85
MEAN	49	54	-2.22	7.10	1.37	1.50
STD DEV	49	54	1.09	1.75	0.23	0.44
STD ERR	49	54	0.44	0.71		
	55	56	-1.00	6.63	1.12	1.17
	56	57	0.51	7.73	1.68	1.85
	57	58	-4.89	7.28	1.11	1.05
	58	59	-.45	6.26	1.51	1.70
	59	60	-1.79	6.97	1.43	1.53
	60	61	-2.28	7.12	1.73	1.91
MEAN	55	60	-1.65	7.00	1.43	1.53
STD DEV	55	60	1.87	0.51	0.27	0.36
STD ERR	55	60	0.76	0.21		

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		POLE POSITION		STANDARD ERROR		SATELLITE
DAY	1969	X METERS	Y METERS	X METERS	Y METERS	
61	62	-1.26	10.06	1.58	1.65	59
62	63	-3.12	6.70	1.17	1.24	60
63	64	-3.77	7.97	1.44	1.53	59
64	65	-6.64	6.15	3.03	4.68	60
65	66	-1.53	7.09	1.39	1.48	59
66	67	-1.58	9.43	1.41	1.66	60
MEAN	61	66	-2.98	7.90	1.67	2.04
STD DEV	61	66	2.05	1.56	0.68	1.30
STD ERR	61	66	0.84	0.64		
67	68	-1.79	7.09	1.08	1.12	59
68	69	-1.78	9.22	1.26	1.46	60
69	70	-.03	9.73	1.49	1.51	59
70	71	-1.45	8.51	1.29	1.53	60
71	72	-.06	10.68	1.28	1.33	59
72	73	-.21	7.98	1.40	1.68	60
MEAN	67	72	-.89	8.87	1.30	1.44
STD DEV	67	72	0.87	1.28	0.14	0.19
STD ERR	67	72	0.36	0.52		
74	75	2.03	11.69	1.75	1.96	60
75	76	-2.94	9.11	1.22	1.30	59
76	77	-.11	11.12	1.39	1.60	60
77	78	-3.15	12.40	1.69	1.83	59
78	79	-3.38	11.71	1.71	1.94	60
MEAN	74	78	-1.51	11.21	1.55	1.73
STD DEV	74	78	2.38	1.26	0.23	0.28
STD ERR	74	78	1.07	0.56		
79	80	-1.48	9.41	1.72	1.80	59
80	81	-.14	7.73	1.43	1.53	60
81	82	-.11	10.23	1.22	1.36	59
82	83	2.57	17.17	1.76	1.94	60
83	84	3.61	8.23	1.17	1.38	59
84	85	0.26	7.62	1.56	1.61	60
MEAN	79	84	0.78	10.06	1.48	1.60
STD DEV	79	84	1.91	3.63	0.25	0.23
STD ERR	79	84	0.78	1.48		

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		POLE POSITION		STANDARD ERROR		SATELLITE
DAY	1969	X METERS	Y METERS	X METERS	Y METERS	
85	86	1.00	10.17	1.47	1.69	59
86	87	-.93	10.70	1.15	1.28	60
87	88	-1.52	11.01	1.37	1.60	59
88	89	0.25	8.26	1.47	1.66	60
89	90	-.67	9.75	1.32	1.62	59
90	91	-1.27	10.11	1.89	2.01	60
MEAN	85	90	-.52	10.00	1.44	1.64
STD DEV	85	90	0.97	0.96	0.25	0.23
STD ERR	85	90	0.39	0.39		
91	92	-1.61	13.40	1.80	2.89	59
92	93	1.31	11.61	1.14	1.27	60
93	94	1.44	11.61	1.16	1.32	59
94	95	-.14	7.94	1.27	1.33	60
95	96	1.28	12.55	1.24	1.39	59
96	97	-.55	11.55	1.48	1.63	60
MEAN	91	96	0.29	11.44	1.35	1.64
STD DEV	91	96	1.25	1.87	0.25	0.63
STD ERR	91	96	0.51	0.76		
97	98	1.67	12.08	1.30	1.60	59
98	99	0.97	11.30	1.51	1.69	60
99	100	-.49	10.43	1.19	1.30	59
100	101	0.13	10.18	1.05	1.15	60
101	102	2.07	8.42	1.05	1.20	59
102	103	0.99	11.04	1.28	1.38	60
MEAN	97	102	0.89	10.57	1.23	1.39
STD DEV	97	102	0.95	1.25	0.17	0.22
STD ERR	97	102	0.39	0.51		
103	104	1.08	9.65	1.11	1.21	59
104	105	0.33	10.32	1.04	1.16	60
105	106	2.84	9.82	1.35	1.44	59
106	107	-1.05	10.77	1.11	1.19	60
107	108	1.62	10.76	0.95	1.04	59
108	109	2.10	10.98	1.16	1.22	60
MEAN	103	108	1.15	10.38	1.12	1.21
STD DEV	103	108	1.38	0.55	0.13	0.13
STD ERR	103	108	0.56	0.22		

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			POLE POSITION		STANDARD ERROR	
MEAN	1969	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
STD DEV	109	110	0.97	12.05	1.36	1.61
STD ERR	109	111	1.28	8.53	1.18	1.25
MEAN	111	112	-.59	9.76	1.14	1.42
STD DEV	112	113	2.95	8.25	1.26	1.40
STD ERR	113	114	2.09	11.97	1.37	1.51
MEAN	114	115	2.58	9.59	1.01	1.07
STD DEV	109	114	1.55	10.02	1.22	1.38
STD ERR	109	114	0.53	0.67		
MEAN	115	116	1.42	11.21	1.14	1.26
STD DEV	116	117	2.17	10.37	1.55	1.65
STD ERR	117	118	2.16	9.28	1.10	1.25
MEAN	118	119	2.71	9.52	1.06	1.05
STD DEV	119	120	0.73	4.67	1.51	2.49
STD ERR	120	121	3.75	12.40	1.16	1.25
MEAN	115	120	2.16	9.57	1.25	1.49
STD DEV	115	120	1.04	2.66	0.22	0.53
STD ERR	115	120	0.43	1.09		
MEAN	121	122	-.63	10.34	1.20	1.41
STD DEV	122	123	2.36	10.00	1.05	1.03
STD ERR	123	124	1.97	14.34	1.51	1.74
MEAN	124	125	2.54	10.03	1.39	1.29
STD DEV	125	126	5.67	13.10	1.41	1.72
STD ERR	126	127	2.02	9.54	1.32	1.37
MEAN	121	126	2.32	11.22	1.31	1.43
STD DEV	121	126	2.01	1.99	0.17	0.27
STD ERR	121	126	0.82	0.81		
MEAN	127	128	2.28	8.80	1.30	1.69
STD DEV	128	129	2.45	9.14	0.90	0.93
STD ERR	129	130	2.75	11.39	1.12	1.34
MEAN	130	131	4.96	9.70	1.00	1.09
STD DEV	131	132	2.26	13.44	1.24	1.47
STD ERR	132	133	5.21	8.19	1.10	1.14
MEAN	127	132	3.32	10.11	1.11	1.28
STD DEV	127	132	1.38	1.96	0.15	0.28
STD ERR	127	132	0.56	0.80		

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DAYS	1969	POLE POSITION		STANDARD ERROR		SATELLITE
		X METERS	Y METERS	X METERS	Y METERS	
133	134	2.49	9.70	1.36	1.71	59
134	135	2.31	11.33	0.97	0.98	60
135	136	1.86	12.11	1.24	1.43	59
136	137	3.92	10.73	1.03	1.09	60
137	138	4.28	12.39	1.54	1.78	59
138	139	5.03	9.58	0.84	0.87	60
MEAN	133 138	3.31	10.97	1.16	1.31	
STD DEV	133 138	1.27	1.19	0.26	0.39	
STD ERR	133 138	0.52	0.48			
139	140	3.21	11.97	1.14	1.29	59
140	141	3.38	9.92	1.04	1.05	60
141	142	2.73	10.90	1.00	1.20	59
142	143	3.68	9.49	1.09	1.06	60
143	144	1.17	9.18	0.94	1.09	59
144	145	4.63	7.86	0.96	0.96	60
MEAN	139 144	3.13	9.89	1.03	1.11	
STD DEV	139 144	1.15	1.42	0.08	0.12	
STD ERR	139 144	0.47	0.58			
145	146	3.58	9.14	1.12	1.24	59
146	147	6.61	7.94	0.99	0.99	60
147	148	3.10	10.19	1.19	1.26	59
148	149	4.53	8.52	1.00	1.04	60
150	151	6.78	9.13	1.01	1.04	60
MEAN	145 150	4.92	8.98	1.06	1.11	
STD DEV	145 150	1.70	0.84	0.09	0.13	
STD ERR	145 150	0.76	0.37			
151	152	3.52	9.24	0.98	1.09	59
152	153	4.92	7.09	0.93	0.94	60
153	154	4.63	9.69	0.92	1.06	59
154	155	4.05	7.15	0.98	0.96	60
155	156	2.62	7.88	0.93	1.05	59
156	157	5.19	8.90	0.93	0.95	60
MEAN	151 156	4.15	8.32	0.94	1.01	
STD DEV	151 156	0.96	1.11	0.03	0.07	
STD ERR	151 156	0.39	0.45			

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		POLE POSITION		STANDARD ERROR		SATELLITE	
DAY	1969	X METERS	Y METERS	X METERS	Y METERS		
	157	158	3.11	9.04	1.08	1.28	59
	158	159	3.91	8.53	1.06	1.08	60
	159	160	3.24	8.49	1.01	1.18	59
	160	161	5.10	8.73	1.04	1.08	60
	161	162	6.20	9.69	1.44	1.69	59
	162	163	2.52	8.07	1.08	1.07	60
MEAN	157	162	4.01	8.76	1.12	1.23	
STD DEV	157	162	1.39	0.56	0.16	0.24	
STD ERR	157	162	0.57	0.23			
	163	164	3.07	7.66	1.06	1.22	59
	164	165	4.72	6.34	1.24	1.22	60
	165	166	3.92	8.88	1.04	1.18	59
	166	167	5.96	8.03	1.28	1.22	60
	167	168	3.99	9.98	1.46	1.59	59
	168	169	4.72	6.65	1.03	1.06	60
MEAN	163	168	4.40	7.92	1.18	1.25	
STD DEV	163	168	0.98	1.37	0.17	0.18	
STD ERR	163	168	0.40	0.56			
	169	170	4.68	8.28	1.28	1.34	59
	170	171	4.94	7.47	0.97	0.97	60
	171	172	6.12	8.14	1.02	1.17	59
	172	173	5.16	8.14	1.17	1.17	60
	173	174	6.01	7.86	1.05	1.21	59
	174	175	3.41	10.75	1.27	1.26	60
MEAN	169	174	5.05	8.44	1.13	1.19	
STD DEV	169	174	0.99	1.17	0.13	0.12	
STD ERR	169	174	0.40	0.48			
	175	176	4.84	9.68	0.98	1.09	59
	176	177	5.51	6.74	0.89	0.89	60
	177	178	3.99	8.91	1.19	1.34	59
	178	179	3.21	9.03	1.10	1.10	60
	179	180	5.02	10.29	1.16	1.23	59
	180	181	4.76	7.41	1.01	1.02	60
MEAN	175	180	4.55	8.68	1.05	1.11	
STD DEV	175	180	0.82	1.35	0.12	0.16	
STD ERR	175	180	0.34	0.55			

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		POLE POSITION		STANDARD ERROR		SATELLITE
DAY	1969	X METERS	Y METERS	X METERS	Y METERS	
181	182	6.90	8.02	1.10	1.14	59
182	183	6.46	9.43	1.25	1.35	60
183	184	6.76	7.49	1.13	1.21	59
184	185	5.06	6.46	1.09	1.14	60
185	186	7.93	7.45	1.06	1.10	59
186	187	7.54	6.29	1.13	1.20	60
MEAN	181	186	6.74	7.52	1.13	1.19
STD DEV	181	186	0.97	1.14	0.07	0.09
STD ERR	181	186	0.40	0.47		
187	188	4.14	6.14	1.01	1.04	59
188	189	6.46	7.82	1.05	1.09	60
189	190	3.97	7.89	1.11	1.14	59
190	191	6.00	6.71	1.04	1.10	60
191	192	4.94	7.02	1.10	1.14	59
192	193	5.12	6.96	1.14	1.20	60
MEAN	187	192	5.10	7.09	1.07	1.12
STD DEV	187	192	0.99	0.67	0.05	0.05
STD ERR	187	192	0.40	0.27		
193	194	4.70	5.38	1.15	1.22	59
194	195	4.65	4.50	1.02	1.07	60
195	196	4.99	5.46	1.55	1.61	59
196	197	5.76	4.38	1.33	1.39	60
197	198	4.76	4.91	1.17	1.21	59
198	199	5.98	5.58	1.05	1.19	60
MEAN	193	198	5.14	5.03	1.21	1.23
STD DEV	193	198	0.58	0.52	0.20	0.19
STD FRR	193	198	0.24	0.21		
199	200	4.33	5.39	1.02	1.01	59
200	201	5.62	5.20	0.98	1.08	60
201	202	4.61	5.56	1.09	1.15	59
202	203	3.11	7.31	1.42	2.32	60
203	204	5.56	5.66	1.04	0.95	59
204	205	5.87	5.44	0.93	1.05	60
MEAN	199	204	4.85	5.76	1.08	1.26
STD DEV	199	204	1.05	0.78	0.18	0.52
STD FRR	199	204	0.43	0.32		

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		POLAR POSITION		STANDARD ERROR					
MEAN	STD DEV	STD ERR	DAY	1969	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
			205	206	6.04	5.54	1.06	1.09	59
			206	207	6.52	5.40	0.96	0.97	60
			207	208	7.80	5.50	1.03	0.99	59
			209	210	5.69	4.38	1.01	0.97	59
			210	211	7.12	2.55	1.06	1.20	60
MEAN	205	210			6.63	4.67	1.00	1.04	
STD DEV	205	210			0.84	1.28	0.08	0.10	
STD ERR	205	210			0.38	0.57			
			211	212	4.09	7.02	0.97	0.93	59
			212	213	5.97	4.81	0.95	1.05	60
			213	214	7.16	7.91	1.06	1.04	59
			214	215	5.23	3.93	1.15	1.28	60
			215	216	6.20	5.12	0.96	1.00	59
			216	217	4.55	6.12	1.09	1.18	60
MEAN	211	216			5.53	5.82	1.03	1.08	
STD DEV	211	216			1.14	1.48	0.09	0.13	
STD ERR	211	216			0.46	0.50			
			217	218	6.56	4.76	0.92	0.93	59
			218	219	5.51	6.14	1.10	1.28	60
			219	220	7.29	2.51	1.05	1.08	59
			220	221	4.16	4.34	1.20	1.41	60
			221	222	7.44	5.52	0.99	1.02	59
			222	223	5.91	3.26	1.00	1.20	60
MEAN	217	222			6.14	4.42	1.04	1.15	
STD DEV	217	222			1.23	1.36	0.10	0.18	
STD ERR	217	222			0.50	0.56			
			223	224	4.44	4.89	1.01	1.04	59
			224	225	6.28	4.23	1.05	1.21	60
			225	226	4.05	3.21	0.93	0.96	59
			226	227	5.30	3.43	1.14	1.28	60
			227	228	3.77	4.11	1.11	1.13	59
			228	229	5.26	3.19	0.95	0.95	60
MEAN	223	228			4.85	3.84	1.01	1.09	
STD DEV	223	228			0.94	0.58	0.11	0.13	
STD ERR	223	228			0.38	0.28			

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DAYS	1969	POLE POSITION		STANDARD ERRORS		SATELLITE
		X METERS	Y METERS	X METERS	Y METERS	
229	230	5,14	4,52	0,92	0,99	59
230	231	6,52	2,69	0,95	1,05	60
231	232	6,71	2,48	1,06	1,11	59
232	233	5,52	3,35	1,00	1,12	60
233	234	4,92	5,19	0,98	1,06	59
234	235	5,09	4,29	1,11	1,27	60
MEAN	229	234	5,65	3,75	1,00	1,10
STD DEV	229	234	0,78	1,08	0,07	0,10
STD ERR	229	234	0,32	0,44		
235	236	3,51	1,21	1,34	1,63	59
236	237	4,93	5,27	1,40	1,60	60
237	238	4,52	2,96	1,03	1,09	59
238	239	2,33	1,96	1,63	2,83	60
239	240	6,71	3,21	1,13	1,19	59
240	241	5,55	4,87	1,23	1,46	60
MEAN	235	240	4,59	2,52	1,29	1,63
STD DEV	235	240	1,54	2,58	0,21	0,63
STD ERR	235	240	0,63	1,05		
241	242	5,29	5,04	0,91	0,89	59
242	243	3,22	3,69	1,11	1,27	60
243	244	4,02	7,00	2,37	2,41	59
244	245	4,00	3,40	2,10	3,65	60
245	246	6,20	2,50	0,99	1,06	59
246	247	8,30	5,42	2,87	3,36	60
MEAN	241	246	5,17	4,51	1,72	2,11
STD DEV	241	246	1,86	1,63	0,83	1,21
STD ERR	241	246	0,76	0,66		
247	248	2,54	1,24	1,32	1,40	59
248	249	5,58	2,80	0,87	0,99	60
249	250	4,94	1,03	1,04	1,12	59
250	251	2,52	3,28	1,10	1,22	60
251	252	3,37	1,81	1,02	1,06	59
252	253	2,94	4,95	0,90	1,02	60
MEAN	247	252	3,65	2,52	1,04	1,13
STD DEV	247	252	1,30	1,48	0,16	0,15
STD ERR	247	252	0,53	0,60		

REPORT 2 REVISION 1  
DAHLGREN POLAR MONITORING SERVICE

		POLE POSITION		STANDARD ERROR		
	DAY 1969	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
	253 254	4.88	3.43	0.95	1.03	59
	254 255	3.96	3.12	1.07	1.18	60
	255 256	6.78	4.63	1.03	1.14	59
	256 257	3.88	1.43	1.02	1.20	60
	257 258	3.10	1.48	0.96	1.06	59
	258 259	4.89	1.29	1.03	1.18	60
MEAN	253 258	4.58	2.56	1.01	1.13	
STD DEV	253 258	1.27	1.37	0.05	0.07	
STD ERR	253 258	0.52	0.56			
	259 260	1.04	2.77	1.30	1.32	59
	261 262	3.16	2.42	1.10	1.23	59
	262 263	7.50	0.57	1.16	1.30	60
	263 264	2.53	2.90	1.18	1.29	59
	264 265	6.12	2.81	1.15	1.30	60
MEAN	259 264	4.07	2.29	1.18	1.29	
STD DEV	259 264	2.66	0.98	0.07	0.03	
STD ERR	259 264	1.19	0.44			
	265 266	3.99	2.26	1.20	1.29	59
	266 267	3.96	0.69	1.26	1.38	60
	267 268	3.94	2.45	1.08	1.20	59
	268 269	4.72	2.86	1.32	1.52	60
	269 270	1.48	-1.28	1.38	1.53	59
	270 271	5.01	-1.23	1.39	1.60	60
MEAN	265 270	3.35	0.96	1.27	1.42	
STD DEV	265 270	1.25	1.87	0.12	0.16	
STD ERR	265 270	0.51	0.76			
	271 272	-0.79	0.67	1.00	1.23	59
	272 273	2.76	3.82	1.22	1.30	60
	273 274	2.91	1.40	1.14	1.21	59
	274 275	3.62	2.03	1.15	1.23	60
	275 276	2.11	2.02	1.06	1.13	59
	276 277	3.55	-0.56	1.07	1.15	60
MEAN	271 276	2.36	1.56	1.12	1.21	
STD DEV	271 276	1.64	1.47	0.06	0.06	
STD ERR	271 276	0.67	0.60			

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DAHLGREN POLAR MONITORING SERVICE

			POLE POSITION		STANDARD ERROR		
	DAY	1969	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
	278	279	3.25	0.83	1.05	1.06	60
	280	281	5.23	-.02	0.78	0.87	60
	282	283	4.91	2.44	0.91	1.07	60
MEAN	278	282	4.46	1.08	0.91	1.00	
STD DEV	278	282	1.06	1.25	0.14	0.11	
STD ERR	278	282	0.61	0.72			
	284	285	2.45	1.19	0.95	0.99	60
	286	287	1.39	0.67	0.81	0.84	60
	288	289	2.30	1.97	0.88	0.94	60
MEAN	284	288	2.05	1.28	0.88	0.92	
STD DEV	284	288	0.57	0.65	0.07	0.08	
STD ERR	284	288	0.33	0.38			
	290	291	3.24	0.62	0.82	0.89	60
	292	293	1.78	-.29	0.83	0.93	60
	294	295	2.82	0.02	0.90	0.97	60
MEAN	290	294	2.61	0.12	0.85	0.93	
STD DEV	290	294	0.75	0.46	0.04	0.04	
STD ERR	290	294	0.43	0.27			
	296	297	3.79	0.11	0.87	0.92	60
	298	299	4.09	-.74	1.00	0.99	60
	300	301	2.28	0.74	0.91	0.87	60
MEAN	296	300	3.39	0.04	0.93	0.93	
STD DEV	296	300	0.97	0.74	0.07	0.06	
STD ERR	296	300	0.56	0.43			

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DAHLGREN POLAR MONITORING SERVICE

		POLE POSITION		STANDARD ERROR		SATELLITE			
MEAN	STD DEV	STD ERR	1969	X METERS	Y METERS		X METERS	Y METERS	
302	303	302	308	2,50	-,43	0,90	0,82	60	
304	305	302	310	1,16	0,15	0,95	0,89	60	
306	307	306	312	1,24	0,82	0,95	0,90	60	
MEAN	STD DEV	STD ERR	308	312	1,64	0,18	0,93	0,87	
308	312	308	312	0,75	0,63	0,03	0,04		
308	312	308	312	0,43	0,36				
314	315	314	314	1,74	1,40	0,85	0,79	60	
316	317	314	318	,60	1,77	0,98	0,91	60	
318	319	314	318	,83	1,40	1,02	0,87	60	
MEAN	STD DEV	STD ERR	314	318	0,10	1,52	0,95	0,86	
314	318	314	318	1,42	0,21	0,09	0,06		
314	318	314	318	0,82	0,12				
320	321			*2,11	0,82	1,05	0,95	60	

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DAHLGREN POLAR MONITORING SERVICE

		POLE POSITION		STANDARD ERROR		
DAY	1970	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
MEAN	13	-8.21	2.87	1.32	1.46	1967-92A
STD DEV	13	-5.73	4.21	1.35	1.47	1967-92A
STD ERR	13	1.78	2.31	1.17	1.32	1967-92A
		-4.82	5.08	1.20	1.31	1967-92A
		-5.73	3.62	1.26	1.39	
		1.78	1.26	0.09	0.09	
		0.89	0.63			
MEAN	16	-5.26	2.27	1.40	1.47	1967-92A
STD DEV	17	-2.84	4.71	1.52	1.54	1967-92A
STD ERR	18	-2.58	4.31	1.45	1.59	1967-92A
MEAN	19	-4.76	5.06	1.12	1.19	1967-92A
STD DEV	20	-3.85	3.22	1.53	1.58	1967-92A
STD ERR	18	-3.86	3.91	1.40	1.48	
		1.17	1.15	0.17	0.17	
		0.52	0.51			
MEAN	21	-5.80	5.95	1.14	1.23	1967-92A
STD DEV	22	-5.20	4.92	1.31	1.41	1967-92A
STD ERR	23	-5.53	5.76	1.33	1.39	1967-92A
MEAN	24	-4.38	6.82	1.37	1.42	1967-92A
STD DEV	25	-5.30	8.02	1.37	1.42	1967-92A
STD ERR	23	-5.24	6.29	1.30	1.38	
		0.54	1.18	0.10	0.08	
		0.24	0.53			
MEAN	26	-5.71	4.94	1.08	1.21	1967-92A
STD DEV	27	-4.39	5.82	1.37	1.33	1967-92A
STD ERR	28	-7.08	4.58	1.42	1.47	1967-92A
MEAN	29	-7.36	5.97	1.54	1.58	1967-92A
STD DEV	30	-7.47	3.48	1.62	1.92	1967-92A
STD ERR	28	-6.40	4.96	1.41	1.50	
		1.33	1.01	0.20	0.27	
		0.59	0.45			

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DAHLGREN POLAR MONITORING SERVICE

MEAN	STD DEV	STD ERR	POLE POSITION		STANDARD ERROR		SATELLITE
			DAY	1970	X METERS	Y METERS	
31	31	-3.13	5.89	1.39	1.51	1967-92A	
32	32	-5.19	5.24	1.62	1.67	1967-92A	
33	33	-5.35	6.16	1.77	1.62	1967-92A	
34	34	-4.40	4.06	1.06	1.21	1967-92A	
35	35	-6.24	4.08	1.40	1.39	1967-92A	
	33	-4.86	5.08	1.45	1.48		
	33	1.17	0.99	0.27	0.18		
	33	0.52	0.44				
MEAN	36	-5.92	3.84	1.36	1.48	1967-92A	
STD DEV	37	-4.93	4.47	1.23	1.26	1967-92A	
STD ERR	38	-6.02	4.57	1.13	1.21	1967-92A	
	39	-6.08	4.21	1.35	1.40	1967-92A	
	40	-5.86	2.03	1.68	1.92	1967-48A	
	40	-1.10	4.44	2.23	2.68	1967-34A	
	40	-3.78	2.72	1.48	1.50	1967-92A	
MEAN	38	-4.81	3.75	1.49	1.64		
STD DEV	38	1.84	0.99	0.37	0.51		
STD ERR	38	0.70	0.38				
MEAN	41	-4.75	0.48	1.49	1.65	1967-34A	
STD DEV	42	-4.25	7.79	2.31	2.40	1967-34A	
STD ERR	43	-6.49	7.14	1.18	1.31	1967-48A	
	44	-8.11	8.58	1.21	1.41	1967-48A	
	45	-2.76	4.44	1.33	1.41	1967-48A	
	41	-4.08	4.42	1.11	1.23	1967-92A	
	42	-6.70	4.90	1.27	1.33	1967-92A	
	43	-4.84	3.39	1.44	1.67	1967-34A	
	44	-3.07	3.45	1.96	2.19	1967-34A	
	45	-2.35	5.07	1.57	1.51	1967-34A	
	43	-5.61	6.25	1.31	1.52	1967-92A	
	44	-5.51	6.46	1.30	1.56	1967-92A	
	45	3.97	5.90	1.77	2.07	1968-12A	
MEAN	45	-6.40	6.75	1.41	1.64	1967-92A	
STD DEV	43	-4.35	5.36	1.48	1.64		
STD ERR	43	2.90	2.10	0.33	0.35		
STD ERR	43	0.78	0.56				

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DAHLGREN POLAR MONITORING SERVICE

DAYS	1970	POLE POSITION		STANDARD ERROR		SATELLITE
		X METERS	Y METERS	X METERS	Y METERS	
46	46	-7.48	7.36	1.36	1.39	1967-48A
47	47	-3.28	5.81	1.09	1.25	1967-48A
48	48	-4.67	6.80	1.13	1.25	1967-48A
49	49	-3.29	7.08	1.57	1.70	1967-34A
50	50	-4.99	6.66	1.14	1.32	1967-48A
46	46	-4.41	7.63	1.84	2.03	1967-34A
47	47	-2.02	5.87	1.50	1.61	1967-34A
48	48	-3.65	8.28	1.61	1.71	1967-34A
49	49	-1.69	3.88	1.70	2.13	1968-12A
50	50	-2.67	7.90	1.45	1.72	1967-34A
46	46	-6.57	8.02	1.62	1.81	1968-12A
47	47	-2.93	5.93	1.70	1.98	1968-12A
48	48	-7.27	9.04	1.74	1.91	1968-12A
49	49	-4.88	6.73	1.42	1.71	1967-92A
50	50	-4.20	7.40	1.64	1.74	1968-12A
46	46	-3.83	4.25	1.58	1.51	1967-92A
47	47	-3.27	6.42	1.26	1.42	1967-92A
48	48	-3.63	5.69	1.38	1.66	1967-92A
50	50	-4.85	6.97	1.34	1.62	1967-92A
MEAN	48	-4.19	6.72	1.48	1.66	
STD DEV	48	1.60	1.30	0.22	0.26	
STD ERR	48	0.37	0.30			

51	51	-5.77	8.12	1.53	1.80	1967-48A
52	52	-4.01	7.54	1.17	1.28	1967-48A
53	53	-6.65	8.69	1.06	1.22	1967-48A
54	54	-5.52	8.24	1.20	1.45	1967-48A
55	55	-4.04	7.42	1.06	1.20	1967-48A
51	51	-4.49	5.13	1.30	1.45	1967-34A
52	52	-5.66	8.49	1.42	1.71	1967-34A
53	53	-4.21	8.15	1.78	2.00	1967-34A
54	54	-5.93	8.41	1.16	1.28	1967-34A
55	55	-4.44	5.00	1.57	1.65	1967-34A
51	51	-2.36	8.18	1.74	2.02	1968-12A
52	52	-3.78	7.75	1.86	2.09	1968-12A
53	53	-2.75	3.94	1.39	1.73	1968-12A
54	54	-7.33	6.25	1.43	1.76	1968-12A
55	55	-.11	5.07	1.23	1.49	1968-12A
51	51	-6.46	5.56	1.09	1.23	1967-92A
52	52	-4.22	5.08	1.03	1.31	1967-92A
53	53	-4.82	7.25	1.15	1.39	1967-92A
54	54	-5.29	5.00	1.43	1.69	1967-92A
55	55	-9.81	8.20	1.22	1.48	1967-92A
MEAN	53	-4.88	6.87	1.34	1.56	
STD DEV	53	2.01	1.55	0.25	0.28	
STD ERR	53	0.45	0.35			

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DAHLGREN POLAR MONITORING SERVICE

DAYS	1970	POLAR POSITION		STANDARD ERROR		SATELLITE
		X METERS	Y METERS	X METERS	Y METERS	
56	56	-3.28	7.10	1.28	1.32	1967-48A
57	57	-2.99	5.31	1.40	1.59	1967-48A
58	58	-5.80	7.84	1.46	1.54	1967-48A
59	59	-3.98	6.12	1.40	1.58	1967-48A
60	60	-3.96	4.56	1.21	1.42	1967-48A
56	56	-5.06	10.13	1.45	1.53	1967-34A
57	57	-3.30	4.42	1.99	2.16	1967-34A
58	58	-3.48	10.30	1.36	1.56	1967-34A
59	59	-.87	10.62	2.19	2.10	1967-34A
60	60	-3.59	7.27	1.75	1.93	1967-34A
56	56	-6.11	6.62	1.82	2.09	1968-12A
57	57	-2.78	6.95	1.64	1.87	1968-12A
58	58	-7.74	4.28	2.19	2.16	1968-12A
59	59	1.47	6.38	2.36	3.14	1968-12A
60	60	-7.05	8.01	1.60	1.78	1968-12A
56	56	-3.12	6.59	1.21	1.30	1967-92A
57	57	-5.89	7.77	1.26	1.61	1967-92A
58	58	-4.32	7.45	1.10	1.28	1967-92A
59	59	-4.40	7.44	0.97	1.27	1967-92A
60	60	-6.25	4.72	1.28	1.42	1967-92A
MEAN	58	-4.13	7.00	1.55	1.73	
STD DEV	58	2.12	1.87	0.39	0.45	
STD ERR	58	0.47	0.42			

61	61	-1.66	7.17	1.22	1.34	1967-48A
62	62	-3.37	9.23	1.28	1.37	1967-48A
63	63	-4.33	7.41	1.64	1.51	1967-48A
64	64	-3.60	10.51	0.99	1.11	1967-48A
65	65	-4.39	7.03	1.37	1.61	1967-92A
61	61	-3.11	6.93	2.33	2.19	1967-34A
62	62	-.74	4.31	1.87	2.23	1967-34A
63	63	-2.06	7.68	1.43	1.75	1967-34A
64	64	-3.64	7.71	1.42	1.72	1967-92A
61	61	-4.64	9.17	1.84	2.24	1968-12A
62	62	-4.97	5.86	1.55	1.68	1968-12A
63	63	-1.91	8.67	1.48	1.82	1968-12A
61	61	-2.32	8.44	1.29	1.48	1967-92A
62	62	-5.52	6.16	1.51	1.49	1967-92A
63	63	-5.25	4.05	1.57	1.85	1967-92A
MEAN	63	-3.43	7.36	1.52	1.69	
STD DEV	63	1.44	1.77	0.32	0.34	
STD ERR	63	0.37	0.46			

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		PCLE POSITION		STANDARD ERROR		SATELLITE
DAY	1970	X METERS	Y METERS	X METERS	Y METERS	
66	66	-5.91	5.55	1.46	1.68	1967-48A
67	67	-3.48	9.03	1.39	1.69	1967-48A
68	68	-7.42	13.94	1.65	1.88	1967-48A
69	69	-4.73	7.95	1.20	1.31	1967-92A
70	70	-3.54	7.98	1.08	1.44	1967-92A
66	66	-3.50	5.76	1.32	1.67	1967-92A
67	67	-4.60	6.16	1.73	1.87	1967-92A
68	68	-4.06	7.92	1.12	1.35	1967-92A
MEAN	68	-4.66	8.04	1.37	1.61	
STD DEV	68	1.39	2.69	0.24	0.22	
STD ERR	68	0.49	0.95			
71	71	-5.43	9.10	1.22	1.48	1967-92A
72	72	-3.78	5.69	1.21	1.64	1967-92A
73	73	-4.58	9.62	1.22	1.62	1967-92A
74	74	-1.95	6.87	1.47	1.65	1967-92A
75	75	-3.54	10.07	1.10	1.41	1967-92A
MEAN	73	-3.85	8.27	1.24	1.56	
STD DEV	73	1.30	1.89	0.13	0.11	
STD ERR	73	0.58	0.85			
76	76	-2.23	8.23	1.75	2.02	1967-92A
77	77	-4.78	8.75	1.07	1.44	1967-92A
78	78	-2.26	8.93	1.14	1.36	1967-92A
79	79	-3.64	9.46	1.42	1.76	1967-92A
80	80	-2.10	6.67	1.28	1.43	1967-92A
MEAN	78	-3.00	8.41	1.33	1.60	
STD DEV	78	1.17	1.07	0.27	0.28	
STD ERR	78	0.53	0.48			
81	81	-1.51	8.98	1.16	1.54	1967-92A
82	82	-.89	8.06	1.09	1.41	1967-92A
83	83	-2.31	8.98	1.44	1.73	1967-92A
84	84	-1.85	9.66	0.97	1.06	1967-92A
85	85	-4.73	9.07	1.28	1.35	1967-92A
MEAN	83	-2.26	8.95	1.19	1.42	
STD DEV	83	1.48	0.57	0.18	0.25	
STD ERR	83	0.66	0.26			

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MEAN	STD DEV	STD ERR	POLE POSITION		STANDARD ERROR		SATELLITE
			DAY	1970	X METERS	Y METERS	
86	86		-2.52	11.06	1.18	1.38	1967-92A
87	87		-4.86	10.11	1.39	1.58	1967-92A
88	88		-.83	12.29	1.06	1.35	1967-92A
89	89		-4.71	11.15	1.33	1.61	1967-92A
90	90		-1.17	9.88	1.16	1.27	1967-92A
88			-2.82	10.90	1.22	1.44	
88			1.90	0.96	0.13	0.15	
88			0.85	0.43			
91	91		-2.21	11.73	1.22	1.37	1967-92A
92	92		-1.90	12.47	1.75	1.89	1967-92A
93	93		-4.37	11.02	1.11	1.28	1967-92A
94	94		-.51	11.00	1.16	1.19	1967-92A
95	95		-3.49	8.19	1.21	1.51	1967-92A
93			-2.50	10.88	1.29	1.45	
93			1.49	1.62	0.26	0.27	
93			0.67	0.73			
96	96		-1.42	8.95	1.21	1.39	1967-92A
97	97		-1.77	11.84	1.15	1.38	1967-92A
98	98		-.81	9.15	1.15	1.32	1967-92A
99	99		-3.32	11.55	1.38	1.61	1967-92A
100	100		-.40	12.94	1.49	1.63	1967-92A
98			-1.54	10.89	1.28	1.47	
98			1.13	1.76	0.15	0.14	
98			0.50	0.79			
101	101		-1.34	11.58	1.55	1.94	1967-92A
102	102		-.26	10.37	1.34	1.61	1967-92A
103	103		-1.93	11.58	1.18	1.34	1967-92A
104	104		-.30	9.16	1.24	1.37	1967-92A
105	105		-3.19	12.93	1.26	1.55	1967-92A
103			-1.41	11.12	1.31	1.56	
103			1.22	1.42	0.15	0.24	
103			0.55	0.64			

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		POLE POSITION		STANDARD ERROR		SATELLITE
DAY	1970	X METERS	Y METERS	X METERS	Y METERS	
106	106	0.69	13.06	1.40	1.52	1967-92A
107	107	-2.39	13.31	1.26	1.55	1967-92A
108	108	-1.01	12.69	1.61	1.66	1967-92A
109	109	-2.74	10.56	1.40	1.59	1967-92A
110	110	-2.73	14.97	1.08	1.22	1967-92A
MEAN	108	-1.64	12.92	1.35	1.51	
STD DEV	108	1.48	1.58	0.20	0.17	
STD ERR	108	0.66	0.71			
111	111	-2.05	9.11	1.37	1.68	1967-92A
112	112	-2.44	11.00	1.03	1.21	1967-92A
113	113	-1.68	13.49	1.08	1.26	1967-92A
114	114	0.81	9.34	1.29	1.39	1967-92A
115	115	-2.36	12.21	1.35	1.66	1967-92A
MEAN	113	-1.54	11.03	1.22	1.44	
STD DEV	113	1.35	1.87	0.16	0.22	
STD ERR	113	0.60	0.84			
116	116	1.08	10.27	1.26	1.40	1967-92A
117	117	0.44	13.29	1.39	1.54	1967-92A
118	118	-.46	12.84	0.98	1.12	1967-92A
119	119	-1.54	12.11	0.97	1.12	1967-92A
120	120	3.79	10.77	1.31	1.51	1967-92A
MEAN	118	0.66	11.86	1.18	1.34	
STD DEV	118	2.01	1.30	0.20	0.20	
STD ERR	118	0.90	0.58			
121	121	-1.69	13.73	1.17	1.37	1967-92A
122	122	0.43	11.29	1.15	1.29	1967-92A
123	123	0.47	11.14	1.12	1.27	1967-92A
124	124	-.75	13.76	1.09	1.30	1967-92A
125	125	0.64	9.75	1.01	1.20	1967-92A
MEAN	123	-.18	11.94	1.11	1.29	
STD DEV	123	1.01	1.76	0.06	0.06	
STD ERR	123	0.45	0.79			

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			PCLE POSITION	STANDARD ERR CR	
MEAN	128	0.27	12.13	1.23	1.32
STD DEV	128	0.96	1.27	0.30	0.22
STD ERR	128	0.43	0.57		
MEAN	131	3.14	12.77	0.92	1.05
STD DEV	132	1.74	10.74	1.27	1.48
STD ERR	133	0.58	13.38	0.97	1.05
MEAN	133	3.64	11.81	1.23	1.39
STD DEV	134	0.94	12.80	1.25	1.36
STD ERR	135	1.78	12.30	1.13	1.27
MEAN	136	1.91	10.32	1.39	1.56
STD DEV	137	0.73	12.04	1.17	1.21
STD ERR	138	2.21	11.56	1.27	1.33
MEAN	138	1.48	11.86	1.20	1.31
STD DEV	139	0.58	10.53	0.76	0.88
STD ERR	140	3.11	14.82	1.43	1.58
MEAN	141	2.51	13.14	0.91	1.03
STD DEV	142	3.82	14.29	1.14	1.45
STD ERR	143	3.45	9.65	1.31	1.49
MEAN	143	1.52	15.08	1.15	1.29
STD DEV	144	2.17	10.98	1.09	1.23
STD ERR	145	2.69	12.63	1.12	1.30
MEAN	143	0.94	2.27	0.14	0.18
STD DEV	143	0.42	1.02		
STD ERR	143				

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			PCLF	POSITION	STANDARD	ERRCR	SATELLITE
DAYS	1970	X METERS	Y METERS	X METERS	Y METERS		
146	146	2.88	12.14	1.43	1.52	1967-92A	
147	147	1.72	11.65	1.50	1.80	1967-92A	
148	148	5.34	10.43	1.13	1.17	1967-92A	
149	149	2.46	13.57	1.05	1.20	1967-92A	
150	150	4.10	10.10	1.41	1.39	1967-92A	
MEAN	148	3.30	11.58	1.30	1.42		
STD DEV	148	1.43	1.40	0.20	0.26		
STD ERR	148	0.64	0.62				
151	151	3.33	13.81	1.20	1.32	1967-92A	
152	152	6.35	10.78	1.73	1.67	1967-92A	
153	153	3.73	15.46	1.02	1.11	1967-92A	
154	154	3.56	11.50	1.38	1.60	1967-92A	
155	155	2.70	15.16	1.07	1.15	1967-92A	
MEAN	153	3.94	13.34	1.28	1.37		
STD DEV	153	1.41	2.12	0.29	0.26		
STD ERR	153	0.63	0.95				
156	156	3.90	12.80	1.32	1.51	1967-92A	
157	157	4.45	11.30	0.93	1.04	1967-92A	
158	158	2.76	13.50	1.04	1.15	1967-92A	
159	159	4.26	10.92	1.03	1.21	1967-92A	
160	160	0.05	14.26	1.63	1.76	1967-92A	
MEAN	158	3.08	12.56	1.19	1.34		
STD DEV	158	1.82	1.42	0.28	0.30		
STD ERR	158	0.81	0.64				
161	161	5.85	10.17	1.33	1.49	1967-92A	
162	162	2.57	11.37	1.39	1.50	1967-92A	
163	163	5.72	11.36	1.53	1.63	1967-92A	
164	164	5.69	10.52	1.36	1.52	1967-92A	
165	165	3.59	12.58	1.16	1.25	1967-92A	
MEAN	163	4.69	11.20	1.36	1.48		
STD DEV	163	1.51	0.93	0.14	0.14		
STD ERR	163	0.68	0.42				

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			PCLE POSITION	STANDARD ERROR		
MEAN	1970	X METERS	Y METERS	X METERS	Y METERS	SATELLITE
STD DEV						
STD ERR						
166	166	5.02	13.11	1.56	1.70	1967-92A
167	167	5.28	12.75	1.03	1.23	1967-92A
168	168	3.77	12.70	1.29	1.48	1967-92A
169	169	3.80	11.94	1.50	1.54	1967-92A
170	170	7.79	9.88	1.68	1.73	1967-92A
MEAN	168	5.13	12.08	1.41	1.54	
STD DEV	168	1.64	1.30	0.25	0.20	
STD ERR	168	0.73	0.58			
171	171	4.57	12.30	0.90	0.97	1967-92A
172	172	5.71	11.41	1.49	1.55	1967-92A
173	173	3.91	10.27	0.94	1.07	1967-92A
174	174	5.31	11.10	1.21	1.38	1967-92A
175	175	6.17	11.89	0.97	1.07	1967-92A
MEAN	173	5.13	11.39	1.10	1.21	
STD DEV	173	0.90	0.78	0.25	0.25	
STD ERR	173	0.40	0.35			
178	178	5.47	10.43	1.06	1.05	1967-92A
179	179	4.58	14.65	1.07	1.28	1967-92A
180	180	4.35	12.24	1.08	1.22	1967-92A
MEAN	179	4.80	12.44	1.07	1.18	
STD DEV	179	0.59	2.12	0.01	0.12	
STD ERR	179	0.34	1.22			
181	181	4.52	9.87	1.32	1.61	1967-92A
182	182	6.64	10.63	1.35	1.34	1967-92A
183	183	5.41	13.01	1.84	1.94	1967-92A
184	184	8.34	10.86	1.05	0.98	1967-92A
185	185	5.42	10.95	1.53	1.54	1967-92A
MEAN	183	6.07	11.06	1.42	1.48	
STD DEV	183	1.48	1.17	0.29	0.36	
STD ERR	183	0.66	0.52			
186	186	6.14	10.22	1.43	1.49	1967-92A
187	187	3.52	11.93	1.31	1.25	1967-92A
188	188	5.86	8.53	1.60	1.76	1967-92A
189	189	2.80	9.63	0.93	0.98	1967-92A
MEAN	187	4.58	10.08	1.32	1.37	
STD DEV	187	1.67	1.42	0.29	0.33	
STD ERR	187	0.83	0.71			

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